This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

KC
3718
Vol. 2

KC 3716

The
SCIENCE OF BUSINESS

BEING

The Philosophy of Successful Human Activity
Functioning in

BUSINESS BUILDING
OR
CONSTRUCTIVE SALESMANSHIP

By

ARTHUR FREDERICK SHELDON

TEXTBOOK B
THINKING, REMEMBERING, IMAGINING

TO ACCOMPANY LESSON FOUR
BY STANLEY L. KREBS

CHICAGO, U. S. A.
1917

KC 3718

Copyright, 1907, by
THE SHELDON SCHOOL

Copyright, 1910, by
THE SHELDON SCHOOL
(All rights reserved)

Entered at Stationers' Hall
London, England
(All rights reserved)

Copyright, 1917, by
ARTHUR FREDERICK SHELDON
(All rights reserved)

TEXTBOOK B

PART I: THINKING

CHAPTER I

THE MENTAL PYRAMID

EVERYTHING we see in Nature is composite—made up of smaller things and still smaller, carrying us back to things so small that we cannot see them.

The atom is invisible; yet all things we do see are made up of a number of atoms, and these atoms are made up of still smaller things called **ions.**

Ions make an atom; atoms in chemical composition make a molecule; molecules organized and united make a cell; and cells unite to form a vegetable, an animal, or a man.

A similar method is seen in the making of the human race. First is the individual. Two or more individuals make a family; two or more families make a group; two or more groups make a clan or tribe; two or more tribes make a people; and peoples compose the race.

It is the same everywhere we look. The sun and planets with their satellites make a solar system;

solar systems make constellations; and constellations compose the starry glory of the heavens.

With this great fact of composition, of increasing complexity presented everywhere by the outer world, we naturally expect the same laws to obtain in the structure of the mind as in that universe of which it is a part. This expectation is confirmed by the facts of mind as we now know and understand them.

The mind is not a simple, single thing, but is exceedingly complex. It is a combination of different elements. It is composed of parts lesser and larger. It is constructed or built of mental contents.

The contents of mind. As we classify them, the contents of mind are sensations, images, concepts, ideas, judgments, laws, and principles.

In Lesson Four we have called ideas, thoughts of the first degree; judgments, thoughts of the second degree; laws, thoughts of the third degree; principles, thoughts of the fourth degree. These are the intellectual contents of the human mind and here they are in their proper places or positions in the temple of the human mind.

Ideas or thoughts of the first degree are in fact a kind of judgment, and may properly be called minor judgments; they are the first form of complete thought about an image or a concept, and when expressed they take the form of a simple

affirmative or negative proposition, as: "This is gold." "Gold is heavy." "Aluminum is white." "This ring is not gold."

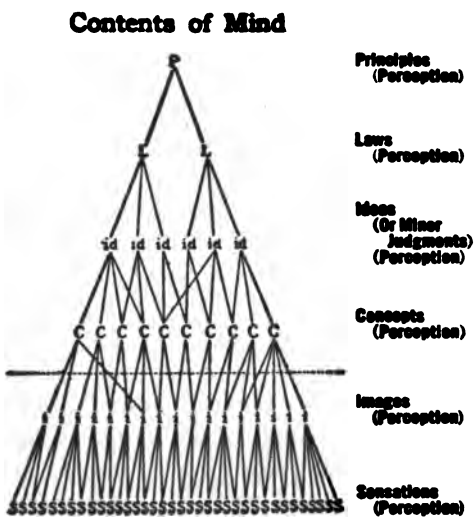


FIG. 1

Figure 1 pictures to the eye the growth and contents of mind. The row of s's at the bottom stands for Sensations; the i's for Images, resulting from sensations; the C's for Concepts, resulting from grouping of similar images; the Id's stand for Ideas; the J's stand for Judgments; the L's stand for Laws; and the P for Principles—the apex of the

pyramid—the basic truths discovered by reason, the highest reach of the human intellect.

Development of mental contents. The way the mental contents grow or develop is as follows: The stimulation or excitation of an afferent nerve causes a sensation, feeling, or mental impression. Two or more sensations from the same stimulus fuse or unite to make an image; by the perception of similarity of two or more images a concept is formed; two or more concepts, or an image and a concept, may be combined to make an idea; two or more major ideas or judgments can reveal a law, and two or more laws may establish a principle.

Always remember that this union, or adherence of two or more of each class, is due to the perception of similarities between them. Two or more sensations fuse or blend in your mind into an image of a certain thing because they come from the **same** thing, as for example, a rose; two or more images may unite to form a concept because they have a feature or features in each similar to a feature or features in all the others; two or more concepts unite to form an idea because they are alike or unlike in certain qualities, and this likeness or unlikeness draws them together or discriminates them in our thinking; two or more judgments reveal a law because similar forces, facts, or features are found, upon investigation, to be present in each of the judgments; and finally two or more

laws establish a principle because each law, though differing from another law in many respects, is found to be based upon the common cause or reason that underlies the other laws.

Thus from the lowest sensation to the highest principle the growth of mind, the pyramid of thought, is rendered sound and solid by the **cement of similarity** which permeates it in all directions.

Thinking begins with ideas. Look at Fig. 1 and observe that below the dotted line is represented mere raw material ready to be built up into something, and that above the dotted line is represented **thought** or **thinking,** that is, the kind of knowledge that makes for successful business and yields the sciences, the arts, the professions, and the philosophies.

Remember that thinking really begins with the formation of ideas—thoughts of the first degree. The thoughtless or unthinking man has sensations. He has images and concepts, but he does not contrast, compare, and combine them; that is, he forms no judgments except a few minor ones that are necessary for mere animal existence. He does no reasoning; he has **materials** for thought, but is too lazy or too indifferent to examine them, to see what fit together and what do not; he forms no plan for building by means of the constructive imagination—the highest of the power of the mind.

The mental builders. A temple must have not

only materials for its construction but it must have builders as well. In the pyramid of thought these invaluable workmen are:

1. The seven senses are the hod carriers. They bring in the raw materials—sensations.
2. Perception is the supervising architect, who sees that the materials are right and that they fit at the right positions in the temple.
3. Memory keeps these materials from being carried off by some thief, such as time and disease, and delivers them when wanted.
4. Conception and reason are the builders, the masons and carpenters who place the bricks and beams in their proper places, where they fit and make order, strength, and beauty.
5. Recognition is the inspector. He examines the building from time to time to see that the work has been properly performed, that everything remains in its place, that there has been no substitution, and that nothing is rotting or wearing away.
6. Imagination is the constructive architect, who lays the plans and specifications.
7. Attention is an assistant supervisor, who watches the whole work from start to finish. He must be present all the time and keep wide awake, else something is bound to go wrong.

All of these mental workers will be considered and duly studied in logical order.

Practical value of this knowledge. The mere understanding of mental processes and the recognition of the beauty of it all is a gain in itself, and no small gain. But more, if we know what all these things are, how acquired, how more of them and a better quality can be obtained; if we know what our thinking power is and how to use it, by this very knowledge we increase our mental ability or our intellectual capacity. This strengthens our mental power, and this increased power we can apply in our daily life and work, whatever our occupation may be, to our own advancement and happiness and to the benefit of our employer, our customers, our families, and our associates.

CHAPTER II

SENSATIONS

YOU remember that sensations give us mental images, and that the increasingly complex associations of these images lead into all the higher ranges of thought—ideas, laws, and principles; then the truth dawns upon you that the highest and mightiest "thoughts" have actually crept into the temple through the humble door of "sensation."

Importance of health. Thought is dependent upon the body. When sick or intoxicated, what kind of "thoughts" will a man have? Suppose he were sick or intoxicated all the time! **Mens sana in corpore sano** (a sound mind in a sound body) is an old truth—true always. Since mind is rooted in sensation received through the body as an instrument, no system of education is sound or complete that ignores health culture. The Sheldon philosophy stands emphatically for the necessity of health of mind and body, and that is one of the tenets that make it sound.

Importance of the sense organs. Sensation must first bring in the materials before we can build any kind of a mental structure. How important, then, is the hod carrier. Despise him not.

Through five main windows—sight, hearing, smell, touch, and taste—the man looks out upon the surrounding universe. These connect him with the world of matter and motion. Through these windows he receives signals and signs to be interpreted and worked up into mental contents. In the workshop of consciousness he sorts his impressions, putting some into one pile, some into another, like with like, and further perceiving that a number of the piles are alike in certain respects, puts them together into one group of piles, and these into larger groups, and so on up to the highest generalization. Thus does he build his inner world—of thought, memory, and imagination.

This union of lesser with larger is the one great law of mental growth, and since it all arises with sensation we can see the great importance of training the mind to the best use of the sense organs and the need of having those organs clean and sound and in good tune.

Turn to Fig. 1. Take the lower left-hand **s**. Run the eye from it along the ascending line to **i**, to **C**, to **Id**, to **J**, to **L**, to **P**. That single sensation has something to do with the ultimate principle. It is true the principle rests upon the whole line of sensations, but this one in particular is just as fully involved.

Now, if that one sensation is false or imperfect—if it has been misunderstood or not rightly interpreted, as for example a result of color blindness,

or if the glance at the thing we study was hasty, then the image of which that particular sensation is an element will be false or imperfect; the concept into which that image enters will so far be false or misleading; the idea into which the concept enters will be partly in error; the law in which that idea is attempted to be used as a demonstration will be falsified, and, finally, the principle which used that law will be no principle because defective, incorrect,

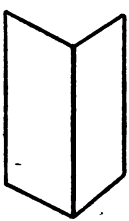


FIG. 2

and misleading. In short, unless we start right we cannot arrive at axiomatic truth, no matter how accurate the intermediate steps.

Sensation defined. A sensation is the consciousness of the stimulation or excitation of a sensory nerve. It may be defined as an impression made upon the mind by the objective world or any part of it. As long as we are in contact with matter through any of the sense organs, and are aware of the fact, we shall have sensation.

When you look at a silver dollar you have sensa-

tions of color, brightness, and form. You know that these are sensations, and not concepts or ideas.

Look at Fig. 2.

Do you see a book, or is it simply a seven-lined figure drawn on the flat surface of the page? Close your eyes and see if you can visualize or mentally reproduce the figure.

As you look at the figure you have a sensation of sight, you are conscious of the figure as simply lines on a surface. When you close your eyes and think of that figure, the mental effect is a recalled image of those lines and the consciousness that it is a book arises from the association of this present image with others that you remember. This association of the present image with others like it is perception. You perceive that this figure is like a book. Had you never seen any books you could not perceive this as a book. You would say it looks like something else that you had seen, or else you would call it something new that you had never before seen.

Sensation has two ends, so to speak, one in the outer world and one in the inner world; one end is in matter, the other end is in mind; one end is the stimulus, like the lines in the drawing, the other end is the effect in consciousness. The line that unites these two ends is the nervous system, at one end of which is the great world of matter, and at the other the equally great world of mind.

Taste candy, and you have a vibration which travels through the tongue nerves to the brain; touch fire with the finger, and you have a vibration which moves through the nerves of the finger, arm, and neck to the brain. Bring a carnation to the nose, and you have a vibration which runs through nerves of the nose to the brain; drop a hammer on the floor, and you have a vibration which rises from the floor, strikes the drum of the ear, sets it in motion, and this motion is communicated to the nerves touching the eardrum on the inside and so it is carried on to the brain; turn your eyes toward the moon, and you have a vibration which travels from the moon through the invisible ether, strikes the retina of the eye so quietly that you don't feel it; but the optic nerves pick it up, telegraph it to the brain, and your mental eyes see the moon.

Something stimulates a sense organ—eye, ear, nose, skin, palate—and immediately sets up a disturbance; this disturbance passes inward along the nerve tracts of the particular sense organ affected, and if the person is awake he has a sensation. If asleep, the disturbance will be there just the same but there will be no sensation, for no effect has been produced upon the mind.

Sensation, re-imaging, reflection. It seems to the adult mind that the senses are directed outward to the thing, while in fact, as we have just seen, it is the thing that excites the nerve and thus awakens

consciousness. After that, thought is directed inward, and watches itself at work on the raw material derived from the action of the senses.

The order is this: We sense what is immediately before our senses, forming mental images; then we recall or re-image these when the cause is not before us; then we think about these images. It is like a person sitting at the window; he opens the shutters, looks out, listens, sees and hears many things; then he closes the shutters or draws the shade, sits down within, and thinks it all over. The oftener he opens the windows the more he will find to think about—the larger his mind grows—the more contents it holds.

Sensations do not deal with relations. Thought does that. Sensations deal with things, each of which seems independent of the others—a fact long ago pointed out by Plato as a characteristic of sensation. Sensation treats each thing as self-existent, independent, non-related. Sensation does not see relations between things; perception does that.

Sensation furnishes the raw materials out of which mind is built up into images, concepts, ideas, judgments, laws, and principles—truths all of which lie beyond the sphere of the senses but which started in that sphere. "All knowledge begins with experience," says Kant, "but it does not follow that all knowledge arises from experience. For it is

quite possible that our experience is a compound of that which we receive through impressions and of that which our own faculty of knowledge, incited by sensuous impressions, supplies from itself."

The mystery of motion translated into thought or of thought translated into motion, no man has solved—it is the Sphinx of psychology.

We can only conclude with James that "the relations of the mind to its own brain are of a unique and utterly mysterious sort"; and with Harris that the soul learns the world through the sensory nerves.

Seven avenues of the mind. When speaking of the seven physical senses we should remember that each has its corresponding mental sense. Every normal man, for example, has four eyes, the two physical organs of sight that he sees through, and the two mental organs of sight that he sees with.

The seven avenues from the outer world to the inner world are (1) sight, (2) hearing, (3) smell, (4) touch, (5) taste, (6) muscular sense, and (7) temperature sense.

Hunger, thirst, pain, and so on, are organic feelings. Self-preservation and self-perpetuation are instincts rather than senses.

It seems almost incredible that by means of these seven agencies we can learn so much about the objects and qualities of the outer world and obtain the materials for the building of the inner world of

thought, memory, and imagination. But such is the truth, and being the truth we can see the great importance of a systematic and thorough training of the senses. You will realize that this training of the special senses is in fact the training of the mental senses. Nature, with the proper nourishment and use of the body by you, gives you the eye, the skin, the ear, the tongue, and the nose. You must train and educate through proper nourishment and use the corresponding mental senses or powers.

The man who sees and hears what escapes the usual eye and ear through inattention or lack of discrimination is the man who has the sense of sight and the sense of hearing trained. The man who can distinguish between the upper and lower half of a bottle of Madeira, the man who by feeling the flour in a barrel can tell whether the wheat was grown in Tennessee or Minnesota, has brought the sense of taste and the sense of touch to a high degree of virtuosity.

Some differences between the senses. Sight is stimulated by fine vibrations of the invisible ether. It is light moving at the rate of 190,000 miles a second that makes things visible. Hearing is most frequently stimulated by vibrations in the air. Air is coarser than the ether, therefore hearing is a grosser sense than sight. Smell is excited by fine particles of matter, fragrance or odor, which are

coarser than air; touch is stimulated by contact with solids, the surfaces of gross things; taste is aroused by dissolving gross matter and coming into close contact with its molecules in solution.

Taste is concerned with only a small portion of matter, touch with a larger portion, smell with a still larger area; hearing covers a wider scope than smell, and sight the widest of all.

The practical bearing of this for the business builder is simply that a man of vital temperament can be reached through a lower demonstration, or by an appeal to taste and touch, while a man of the mental type can be more easily reached through sight or hearing.

We cannot get below sensations. The sensations cannot be split up by the keenest analysis into any simpler processes. It is the mental unity, the mental alone, which by multiplying and combining rears aloft this mighty temple of thought. The mind is at its lowest stage when sensations arise, coming from vibrations, traveling inward along the afferent nerves. It is at the foundation; it is at the infant or animal stage. But the moment it attempts to think or reflect on other sensations it at once rises to a higher stage; a wonderful change takes place—progress of a unique kind has begun.

CHAPTER III

IMAGES

AN image we define as the union of all the sensations coming to the mind from vibrations produced by one object in the outer world. Or, an image is that content of the mind which is the result of the union of two or more sensations from the same object. The object may be one of sight, hearing, smell, touch, muscular sense, taste, or temperature.

You hear a bell ring. It is loud instead of soft, of high pitch instead of low, clear instead of dull. While it is ringing, sensations of loudness, high pitch, and clearness are entering your mind. The union of these three sensations gives you your complete mental image of that sound.

You see an automobile. While you look at it, sensations of color, shape, size, and so on, are streaming into your mind—the mental union of them all constitutes an image of that automobile.

As there are seven senses informing the mind of the outer world, there may be seven kinds of images. An image made up of sight sensations is named a visual image; an image made up of sounds is an auditory image; an image made up of smells

is an olfactory image; an image made up of sensations of touch is a tactual image; an image made up of sensations of taste is a gustatory image; an image made up of muscular strains is a motor image. And the organic feelings of hunger, thirst, and pain will give an organic image.

A **compound image** is one composed of sensations from two or more of the senses. For example, you see a cigar, you smell it, touch it, weigh it; thus four senses are engaged in sending messages from that one object to your mind, forming there a compound image of a cigar.

No mental image can result from only one sensation, for the image is a union of two or more sensations from the same object.

There are at least three sensations flowing from any visible object: color, form, size. A smell gives at least two sensations: quality (such as sweetness or sourness) and degree—mild or strong.

Nature shapes our images. It is not possible artificially to group sensations so as to form a true mental image. Nature does this for us. The law is: "Any number of sensations from any number of sense sources received simultaneously by a mind fuse into a single mental object or image for that mind. All things fuse that can fuse, and nothing separates but what must separate."

When I say, "Here is a thing that is round, the size of my fist, yellow, fragrant, acid-sweet, soft,

and slightly rough on the surface," you know I am describing an orange, because Nature has brought these elements together in that one object and the sensations arising from it will be naturally grouped.

Re-imaging. After obtaining images through combining sensations the mind has the power of reproducing or representing these images in consciousness. This power of calling up mental images from the storehouse of memory and making them appear in the field of consciousness may be exercised once or many times, and it is strong or weak according as the recalled image closely resembles the original sense perception or departs from it. This subject will be discussed in the chapter on "Memory."

In imaging, the sense organs are affected by vibrations from the object. In re-imaging, the sense organs are not affected. We simply recall our impressions.

A man born deaf cannot have auditory images and therefore cannot re-image auditory images. A man born blind cannot form visual images, nor can he re-image visual impressions. But a man becoming deaf in later life can re-image sounds. He can think of the sounds he did hear. Beethoven wrote some of his most admired compositions after he had entirely lost his sense of hearing.

Consciousness of relations. In imaging and re-imaging we first become conscious of relations.

Pure sensation perceives the world as made up of unrelated and independent things. But as soon as we come to imaging we find that certain sensations always go together, as for example, the elements of the orange, the elements of the cigar, and so on. So in a thousand experiences of the senses. Thus we become conscious of relations, and a new world opens up for us—the inner world of thought, in which we travel on from images to more numerous and complex relations through concepts to ideas, judgments, laws, and principles.

When we begin to perceive relations the mind grows rapidly. The purpose of all intellectual training, commonly called education, is to enable us to form these relations, test them, and determine their truth. The man who can see and express these various relations has acquired much of that ability which you as students are seeking to develop.

The image a mental thing. The image is purely mental. We think of it as in the outer world, and seem to project it there, but it is in fact purely mental and a part of ourselves. We can study it, watch it, bind it up with other images or loosen it from them. We do not need to go out and fetch it in, for it is within us. And in watching our images we are watching ourselves. We are really examining our own minds and their contents.

At the point in the pyramid of thought marked by "images" we turn from the world of matter to

the world of mind. We abandon circumspection, or looking about, and employ introspection, or looking within.

I think of an image which is part of myself—a content or part of the mind that is thinking. The thinker is subject and the mental content or image is object. I perceive myself thinking of part of myself.

Richness of images. The more numerous the sensations of a given object, the richer your image of that object will grow. How much richer an object becomes after you have studied it! That is simply because you look at it often and from different viewpoints. You weigh, measure, test, examine with a microscope, investigate with all the senses, so that ever afterward, when that thing is mentioned in your hearing, there arise in your mind many memories of sensations which make the total image rich and full. Thus richness in images and, as we shall see, breadth of ideas lie in multiplying different sensations from the same object.

Richness grows right up from the soil of sensation. Two persons notice a stone by the railroad track. One sees merely a stone; the other observes certain colors, a peculiar odor, the weight of the mass, and declares that it is a piece of iron ore. What is the difference between these two men as they look at that stone? The one has had few sensations from iron ore—the other many.

Ordinary people can hardly tell the difference between iron and steel, cast or wrought. Let a workman come along who has rich images built of many sensations, tests, and experiments with iron and steel, and at a glance he will tell the difference. And taking up the steel alone he will inform you whether it is crucible steel, Bessemer steel, open-hearth steel, mitis, shear, blister or puddled steel. How rich his steel images are! And he can talk

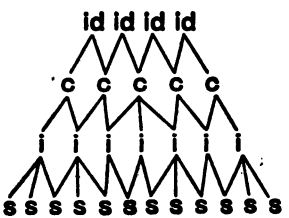


FIG. 3

all day long about them. He knows something. He is an able man in the steel business.

The chemist will have still richer images than the workman, for in the laboratory he has gained a whole range of new and different sensations of sight, of colors, of weight, of smells, of touches, of heat and cold. And into his images of steel enter memories of graphite carbon, combined carbon, silicon, phosphorus, sulphur, manganese.

The difference between people in respect to rich-

ness of images and ideas is shown graphically in the two diagrams, Figs. 3 and 4.

In Fig. 3 the images are light; they are not rich, vivid, and warm. Here is shown the content of a superficial mind. The man has not studied anything thoroughly. He has had few sensations; hence his images are lean.

The man represented by Fig. 4 has had many sensations from the same objects. His images are

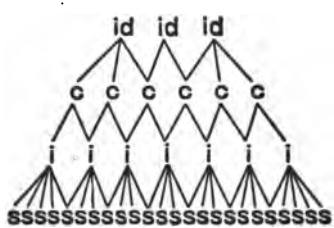


FIG. 4

richer, warmer, more vivid. He has studied, analyzed, and weighed. His ideas are fuller, larger, more weighty. He has more knowledge.

The practical lesson. We should strive to make our images of the things we see and handle from day to day as rich, warm, and vital as possible. Fertility in ideas, initiative, originality, resourcefulness, forcefulness as speakers of words and doers of deeds, all elements of Ability, grow right up in this soil. Get this kind of soil into the mind, plenty

of it, and every day bring in some new sensation, or a more delicate, more discriminating, more suggestive one. Thus will the soil grow rich and fruitful in ideas and produce later for you an ample harvest.

CHAPTER IV

CONCEPTS

"MY father" refers to a particular man and is, therefore, an "image," as we have just seen; but the word "father" is more general in its meaning and wider in its scope, for it embraces all men who have children of their own. The word father represents a concept.

Conception is the mental act of grasping the common qualities of many objects or many similar objects and uniting them into a single notion; this single notion is a concept, and the word expressing it is a common noun.

Our first words learned in childhood were names of **images,** such as "papa," "mamma," "brother," "sister," "Bill," "Jake"; but later in life, in writing and speaking we generally use concepts, words applying to many objects **of a class,** common nouns such as "steel," "engine," "metal," "man," "horse."

Suppose a child has seen but one horse. That child cannot possibly have the concept "horse," for **one individual does not make a class.** If a zebra should be brought to that child, it would surely call it "a horse," as the horse-making image is the only

animal image in the child's mind that the zebra looks like; a mule also would share the same fate as the zebra, and even a hornless cow might, too. But when another horse is brought up to the child he notices the great **similarity** of this new animal with the one before known, and as other horses are met with the definiteness of the **class** "horse" increases so that ultimately the child can readily detect the **difference** between a zebra and a horse, and will no longer be tempted to class them together.

Many other illustrations might be used here, but this is sufficient to show that the more objects of the one class we see, the clearer and clearer the concept becomes.

Meaning of the word "concept." The word concept comes from two Latin words, **con,** "together," and **capio,** "I take," that is, I take a number of qualities or objects and bind them together into one word that represents them all, as I bind a pack of cigars together because they are alike, or a carload of steel rails because of their likeness, and this mental bunch we call a "concept."

Hence the mental process called "conception," or the forming of concepts, consists of three steps: (1) comparison of images, (2) analyzing or picking out the similar images from the dissimilar, and (3) synthesis, or the putting together into a bunch the similar images.

All this is a purely mental process. In sensating

or receiving sensations we must have the outside world before us, but in re-imaging, and now again in conception, no nerve currents are required. To produce sensations, things must be present to one or more of the senses. In conception no things are present; we simply use the mental images of things, and these images we can have with us when the things themselves are a thousand miles away.

Without any force being present or moving us at the moment, still we can conceive of "force" at that moment. You never sensed any concept. You never saw, heard, smelled, touched, or tasted relations, force, existence, number, horse, cat, steel.

"What! You say I never touched or handled steel?" I reply that it is precisely what I wish to assert and reassert. You have handled a piece or pieces of steel, but you never handled "steel." The concept "steel" embraces all the steel that you can think of (conceive), past, present, or future. A concept is purely a mental thing, and therefore cannot be handled like physical things.

Degrees or scope of concepts. Of these there are three, namely, minor, major, and universal. Every one knows that some words mean more, embrace more, have a wider scope, than other words. "Man" embraces more, in its extent of application, than the word "European," and "European" more than "Englishman." The higher the concept the greater number of individuals it embraces in its class.

Which of these words includes the most things?

—Circle, figure, or space? engine, steel, or metal? yesterday, December, or time?

The question answers itself, for "circle" is but one of many kinds of figures and so embraces less than the word "figure" does, hence it is a minor concept; "figure" is a major concept, and "space" is a universal concept.

The process is simply making larger and larger classes, until we land in universal concepts, such as "time," "space," "causality" (cause and effect), "degree," "direction," "number."

Kinds of concepts. There are three kinds of concepts.

1. We can see through water, glass, quartz, mica, air, many gases, and this quality of **being seen through** we select as the one similarity among many differences, and give it a name, "transparency." This we call an "abstract" concept, because we have abstracted it, or picked it out from among many other qualities.

2. When **whole things** are alike, such as a thousand horses, we call the class "horse." This is a "concrete" concept.

So, then, if we think of similar **things**, we get concrete concepts, such as "horse," "man," "rose," "steel," "star"; if we think of similar **qualities** we get abstract concepts such as "red," "heaviness," "sourness," "sweetness," "roughness," "virtue," "wisdom."

3. We have also concepts of action, motion,

being. A great many similar acts are grouped under the concept "walk"; "is" represents many similar states of being; these we have called "verbal" concepts, because the word that is used to name them is a verb.

The Practical Use of Concepts

First: They bring order out of disorder. How many classes or groups can you make out of the miscellaneous marks in Fig. 5?

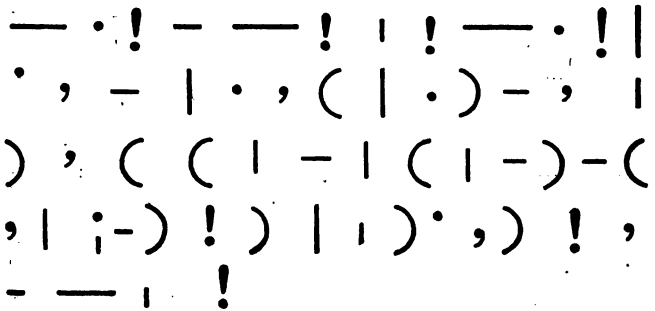


FIG. 5

Minor Concepts	Major Concepts	Universal Concepts
Long vertical lines Short vertical lines Long horizontal lines Short horizontal lines	Lines	
Left curves Right curves	Curves	Marks or figures
Periods Commas Exclamations	Punctuation marks	

That whole seeming confusion is soon brought to order when we see the classes of like things of which it is composed.

Second: Concepts give us the origin of language. Concepts distinguish man from animals. Animals stop at images. Language has its birth with concepts, seeing the particular in the general and uttering the same sound or sounds every time the same thought comes into mind. To know words and their meaning is a power of almost infinite significance, and brings man into touch with the highest and most inspiring intellectual influences of men. Concepts reach beyond what is transient and variable to what is general, universal, permanent. A particular tree may change and die, but the concept "tree" abides forever.

Max Müller says, "A brute cannot speak because he cannot form a concept." Concepts are, therefore, supremely important, because they are the basis of all language, thought, expression—the means of communication between mind and mind.

Accurate language and discriminating thought consist in noting differences in the scope and significance of concepts which the thoughtless never notice or study.

Besides bringing order out of confusion in our thinking and offering a means of expression for

thought in language, concepts are used for other practical purposes.

Coupling up concepts. Professor Tichener says: "As we look out upon the world three things strike us: 1. In the first place we are struck with the likenesses and differences among things. Every thing is more like certain things than it is like certain other things. 2. We are struck by the arrangement of things in space. One thing is here, another is there; one is far off, another close at hand; one is large, another small; one of this form, another of that. 3. And last, we are struck by the progress of things in time. The thunder follows the lightning, one train of cars follows another."

Now, all these aspects are of the greatest practical importance. To realize this point, just imagine a mind not able to note these differences and similarities, or able but still not noting them.

Think of the importance of the first thing to the industrial world, to the workman, manager, and merchant; the importance of noticing likenesses and differences in the materials they handle, of knowing good ore from bad, good machinery from bad, good timber from poor. Think of the importance of the second thing to the railroad man, brakeman, engineer, and others. Also the importance of the third. We do all our thinking upon which our **doing** rests, by **coupling up concepts.**

The greatest of all practical uses of concepts, if you wish thoroughly to **master** any particular trade, job, subject, business, or profession, is to make a written list of all the minor, major, and universal concepts belonging to that particular line of work, and then simply study **their relations to one another.** You will be surprised to see how many new ideas that will give, new insights, new combinations, some of which may rise to the dignity of actual discoveries.

We shall recur to this thought in the chapter on "Ideas" and treat of it fully, as a science and an art, in Part III of this textbook, which treats of "Imagination."

Concluding thought. Concepts in thought correspond to classes in Nature. Such classes as mammals, roses, birds, flowers, berries, metals, forces, electricity, and so on, seem to exist in Nature herself. "They have a deeper significance than our common concepts and seem to have a reality in the divine order of things."

Some philosophers teach that all the objects of the whole material world were constituted after the patterns the Creator had in His own mind. Hence it is the purpose of science to discover the **concepts** of the divine mind. Believing thus, the student may exclaim with Kepler, "O God! I but think Thy thoughts after Thee."

CHAPTER V

PERCEPTION

PROFESSOR JAMES says: "Sensation gives us mere acquaintance with objects, whereas perception gives us knowledge about them."

The great masses of our sensory experiences are perceptions; the recognition of an object as this or that, as like certain objects and unlike certain other objects, is perception. So every act of perception involves classification.

When your eyes fall upon such an object as a horse you are instantly conscious of a single object. You know that it possesses four legs, solid hoofs, a mane and tail, and is of a definite color and size. You notice these features when you perceive the horse, but notwithstanding the large number of sensory nerves that are being stimulated and the many sensations arising therefrom, the fact is that you perceive it not as an aggregate of qualities and parts but as a whole. And this is usually the case with visual perception.

You can analyze it into its parts. You can classify it and place it in its proper group, because you already have gained the concept "horse" and you now perceive marks of similarity between this

and other animals, and these marks of similarity enable you to refer this particular animal to its proper group or class. That is, you perceive that this animal belongs to the class "horse."

Recognition. Recognition is a kind of perception. We might call it a narrow branch of perception. Recognition is identification. It is the consciousness of former acquaintance with the object now present to the senses.

Perception places a given image in a class of similar sensation memories, while recognition places it alongside of only one former image, which it is exactly like. We identify the image from a group of sensations either with a class of like images, or else with a single image already in mind.

Identifying the image with a class is **perception**; identifying it with only one image is **recognition.**

I see an object moving far down the road. Is it man or beast? I cannot yet tell; it is too far off. It comes nearer. I now **perceive** that it is a man (identify this present image with a class already in mind). On coming nearer I **recognize** this man as my father (identify the present image with a single image already in mind).

Thus from the universal concept "object" we limit the scope to "man," and then to one man, "my father."

So we say perception puts an image in its class,

but recognition puts it in the smallest class possible, the unit class, the class of one.

Observation. Attention is needed that we may perceive objects as they are and as like or unlike certain other objects, so the common name for perception is **observation.** People as a rule are poor observers. How many young people can tell the difference between an oak tree and a beech tree, between granite and marble, between cast iron and steel, between linen and cotton?

How many legs has a fly? How many has a spider? Are the ears of a cow in front of her horns, above them, or behind them? Have you not yet observed their position? When fortunate enough to meet a cow, you should add a few more sensations and perceptions to your present supply.

Frequently the so-called uneducated are better observers than the product of the schools. The untutored savage will guide his way through the forest by the voiceless moss on the trees, pursue a foe by the broken twigs or displaced grass where Mr. No-Eyes would be lost and blind to all these silent signals.

Observation is the basis of all our common knowledge. But it is likewise the basis of science itself. Agassiz spent days and nights in observing, dissecting, and classifying the turtles of North America. Many are the illustrations of this power

of observation; they would and do fill volumes of thrilling interest. Observation is valuable in literature, to the poet, orator, writer. They perceive beauties, truths, colors, situations, which the uninspired pass by, having eyes that see not and ears that hear not.

Let no one suppose that business is so "cut and dried," hardened and galvanized in its experiences and methods as to present the likeness of a gigantic machine where observation and individualism count for nothing. Observation is inherently fundamental to success in all business lines and individual occupations.

The watchmaker who could not perceive a slight injury to the delicate mechanism of a watch would be a good-for-nothing in that business; the banker who, in the rapid handling of money, could not detect the counterfeit, would have to resign his job. Iron and steel men can differentiate qualities and classes at a glance; the successful merchant can tell the quality of goods by his trained touch; and so all along the line.

Perception, then, includes recognition and observation, but it is more than either or both. It is that activity of the mind by which we see new things in old objects, observe new qualities which before escaped us and by which we discriminate, find differences and likenesses, and refer a present

or recalled image to its proper mental group or concept.

Sometimes the image may be such as to fit a number of concepts and not one only. For example,

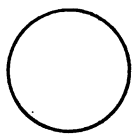


FIG. 6

of what does Fig. 6 remind you? What do you perceive in it? You can class it in the concept "ring," "hoop," "finger ring," "sun," "full moon." You perceive different things in it according to what mental class you place it in.

What constitutes fine perception. Wherever a new thing is presented to any of the senses we immediately begin to think what we have tasted, touched, smelled, heard, or seen like it. The wider our experiences, the more readily shall we find something similar in mind to that thing before our senses at any particular moment. The more images we have, the more definite and rapid will be the classification of anything new that comes along. The quicker we can classify a thing, the finer our perception is. An untrained or unscientific observer may note a great many points about a plant or a piece of steel, and yet cannot tell what that plant is or to what type of steel the piece of steel belongs, but a botanist or a steel man, one who is trained, one who has many experiences with plants and with steel respectively, can pick out a few essentials and distinguishing characteristics and thereby place

the plant or the piece of steel in its proper class; he is quick in perceiving.

Illusion. An illusion is a false or erroneous perception, which is often called a deception or fallacy of the senses. This is misleading, for while there is undoubtedly a measure of illusion in most perception, the so-called fallacy or deception of the senses is not a fallacy of the senses proper, for these usually operate fairly enough, but of the intellect, which wrongly interprets what the senses give.

We often see things as we think they ought to be and not as they are. Thus, if we meet the word "prefect" in proper connection, we may easily read it as "perfect" and never notice the difference.

Illusions of sound are very common. You hear your name called; as a matter of fact the sound that your intellect interprets thus may have been any vibration of the air from the sound of a similar name to the ringing of a bell, the barking of a dog, or the whistle from a near-by factory.

Illusions of touch are easily produced. Crossing the first and second fingers and rolling a shot or a small marble with the ends of the crossed fingers gives the illusion of two objects. The sense organ is in no way at fault. It sends in its report just as it always has done—the mental reaction is simply wrong.

Recency of similar experience, expectancy, and habit are all possible sources of illusory perception.

In Fig. 7 we can see a picture frame, the frustrum of a pyramid, the entrance to a tunnel, or twelve lines on a flat surface. There is only one object presented to the eye; the image on the retina is the same in each case. The eye cannot be held liable for the several interpretations. The fact is that lines like these have been connected in former experience with the several objects named. Consequently, the appropriate brain reaction may be

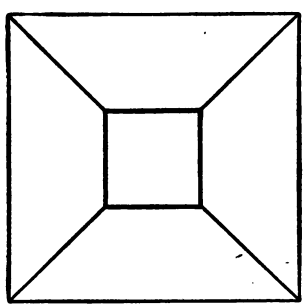


FIG. 7

called out. It thus appears that while a part of what we perceive is already from the outer world, another part, and often the contributing part, is supplied from within ourselves.

The illusions given by the drawings in Figs. 8, 9, and 10 are very complex, and no doubt the stimulation of the muscle of the eye is a preponderating element in illusions of this kind. Which line in

Fig. 8 is the longer? Is Fig. 9 a perfect square? Is Fig. 10 a perfect circle? (Give your mental answers to each of these questions before you measure.)

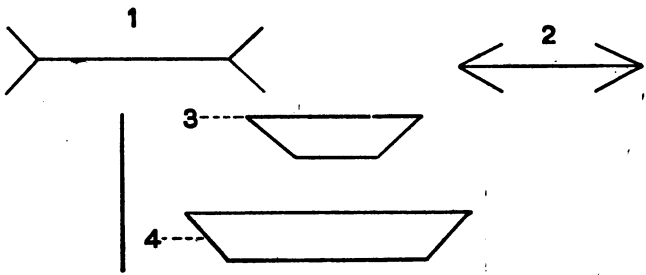


FIG. 8

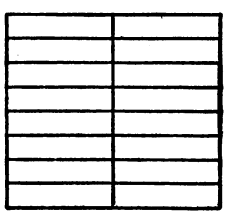


FIG. 9

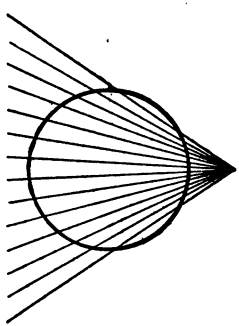


FIG. 10

The main functions of perceptions. "Sensation has been described as the process in which mind and matter come together. Perception, in a similar

way, may be considered the point on which the past and the present come together for the creation of a new object."

"The perceived thing is not simply the present vibrations of atoms and molecules called light or sound or what not; it is these vibrations as interpreted by a psychological organism."

"Perception furnishes us our primary knowledge of a world of things."

"It is the first actual and complete step in the process of knowledge."

"Perception is the gateway through which the mass of sensory excitations must pass before they can be permitted to issue in thoughts, words, and deeds."

Perception is the first of the conscious operations by which the life of control over movements is begun.

CHAPTER VI

IDEAS, OR THOUGHTS OF THE FIRST DEGREE

HAVE you ever wondered what kind of a thing you have in mind when you feel an intention to say something before you say it? You see and know what you are going to say, and sometimes a good while before you say it.

This mental thing you "see and know" before you say it is an "idea," or thought of the first degree. An idea in mind, unexpressed, pushing for birth, is one thing; the same idea in language, expressed, born, is another thing; and that idea applied to life and work, adult, grown up, is still quite another thing.

Ideas are made by the union of two or more concepts. For example, "logs" is a concept, "railroads" is a concept. Now if we can unite these two concepts in one statement we shall then produce an idea, and here it is: "Logs are used for building railroads." Don't you see, until we **relate** or **unite** these two concepts we have no idea concerning them? (Remember the point that all mental processes **above** sensations consist in discovering and establishing relations.)

"Steel is strong" is an idea—composed of the two concepts "steel" and "strength."

Ideas are of two kinds, major and minor. When two concepts are combined we have a major idea. But an image and a concept may be combined in a single statement, and when this is done we have a minor idea, such as, "This piece of steel is strong," for here a particular portion of steel, right before your eyes or in your hands, is compared with the concept "strength." Take another example: "A pile (an image) of logs (concept) is by the side of the railroad" (an image). This is a minor idea, having two images and one concept entering into its construction.

"Steel is strong" is a major idea.

"This piece of steel is strong," is a minor idea.

"Logs are used in making railroads" is a major idea.

"A pile of logs is by the railroad" is a minor idea.

The difference is clearly shown in Fig. 11.

Expression of ideas. In expressing ideas we reveal both thoughts and feelings. Emphasis is the main index, but intonation, pitch, and volume of voice are also indexes for all who can interpret their subtle meaning.

If you watch and learn to interpret tones of voice as well as gesture and attitude, you can fairly read the ideas and feelings in other people's minds and perceive what points they really consider the

most important. Such mind reading may be of very great value to you.

Mental power is measured by mental contents. The animal consciousness stops with images. Infants and children, for a varying length of time, have few ideas.

An ignorant man, a man of limited experience and few ideas, may by pushing the few he possesses

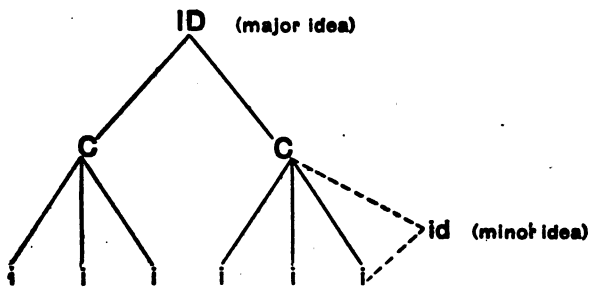


FIG. 11

become strong along a certain line, but he will always remain narrow minded and lack vision.

An educated man, a man of wide experience, is a man of many ideas. He should be inventive, ingenious, original, hopeful, broad, and provident. Such a man, if he have a weak will or poor health, is a mere builder of air castles or else the initiator of new ideas for others to use. If he pushes one or two of his many ideas he will display executive

ability; he is broad minded, intelligent, and practical, a man of wisdom and power.

Mental tendency to ruts. There is a ceaseless struggle in every mind between the tendency to keep its ideas unchanged and to revise and enlarge those ideas. "Every new experience," says James, "must be disposed of under some old head." (We must classify it somewhere. We must place the particular in the bosom of some general class.) "The great point is to find the head which has to be **least altered** to take in the new intruder.

"Certain Polynesian natives seeing horses for the first time called them pigs, that being the nearest head. My child of two years played for a week with an orange that was given him, calling it a 'ball.' He called the first whole eggs he saw 'potatoes.'

"Hardly any one of us can make new heads easily when fresh experiences come. Most of us grow more and more enslaved to the stock conceptions with which we have once become familiar, and less and less capable of assimilating impressions in any but the old way. Old fogyism, in short, is the inevitable terminus to which life sweeps us on. Objects which violate our established habits of thought are simply not taken in at all.

"Genius, in truth, means little more than the faculty of perceiving in an unhabitual way. This victorious assimilation of the new is in fact the

type of all intellectual pleasure. The lust for it is 'curiosity'; the relation of the old to it, before the assimilation is performed, is 'wonder.' We feel neither curiosity nor wonder concerning things that are so far beyond us that we have absolutely nothing in our minds with which to compare them. Only what we already partly know inspires us to know more."

CHAPTER VII

JUDGMENT, OR THOUGHTS OF THE SECOND DEGREE

A SAILOR'S keen sense of sight observes a speck on the horizon. "It is a ship," he asserts. This statement is an idea of his, a minor idea, composed of "a speck" (an image) and "ship" (concept). It is an idea that states a conclusion, his judgment on this speck, his opinion.

The question is: Is his judgment right or wrong? Is this opinion of his reliable or unreliable? To answer this we must see upon what **reasoning** his judgment is based.

The sailor, on more than one occasion before, had observed similar specks on the horizon. Approaching closer, these specks enlarged until ships came clearly into view. All this experience lies in the sailor's memory, in the image-room of his mind. To-day he again sees a speck on the horizon. He classifies it at once with his collection of similar images, and his conclusion is drawn accordingly. The real steps in this mental process of arriving at a judgment are as follows:

1. Specks on the horizon at sea are ships.
2. There is a speck on the horizon now.

3. That speck is a ship.

What is a judgment? The characteristic feature of the judgment, or thought of the second degree, is that it is a thought built up by combining, in a special way, two or more thoughts of the first degree, or even other thoughts of the second degree, and perceiving a relationship between them, this relationship being expressed in the resulting thought of the second degree.

Take the illustration of the sailor and the speck on the horizon. "Specks on the horizon at sea are ships." This is, in a broad sense, an idea, or thought of the first degree, built up out of the concepts "specks," "horizon," "sea," "are," and "ships."

In a stricter sense, it is also a judgment, or thought of the second degree, the result of combining these two ideas, or thoughts of the first degree:

1. "I have seen many such specks on the horizon at sea."
2. "All such specks have turned out to be ships."

The resultant judgment, or thought of the second degree, is, of course, "Therefore all such specks on the horizon at sea are ships."

You will be interested to note that even the second idea, or thought of the first degree, used in the illustration of the sailor can be resolved into

the form of a judgment, or thought of the second degree, thus:

"A certain appearance at the meeting of sky and sea means that there is a speck on the horizon."

"That appearance is at the meeting of sky and sea now."

"Therefore, there is a speck on the horizon now."

By a little study you will be able to resolve each of the ideas used here into its component ideas, thus making of it a judgment, or thought of the second degree.

Distinction between thoughts of first and second degrees. "Is there no distinction, then," you ask, "between our ideas and our judgments—between our thoughts of the first degree and thoughts of the second degree?"

My answer is both Yes and No. Strictly speaking, every one of our ideas, or thoughts of the first degree, is a judgment, and every one of our thoughts of the second degree an idea, or thought of the first degree—a combination of images and concepts or of two or more concepts.

Broadly speaking, there is a distinction, and a very important one, from the standpoint of the science of Ability Development.

Concepts, or concepts and images, combined into a simple statement of fact about which there can be no controversy, such as are derived directly from

sensations and perceptions, we shall call ideas, or thoughts of the first degree.

Concepts, or concepts and images, combined into a statement involving an expression of the opinion of the speaker or writer, or resting upon previous ideas or judgments, we shall call judgments, or thoughts of the second degree.

Things that are so clear and simple as to be ideas or thoughts of the first degree to some minds, may have to be broken up into their component ideas for others, thus making them thoughts of the second degree.

For example, to the old sailor the statement, "Specks on the horizon at sea are ships," may be a simple idea, a thought of the first degree. But to the landsman the statement would be a judgment, a thought of the second degree, built up out of two or more ideas, or thoughts of the first degree.

Judgments are simply our ideas, and, like ideas, they are major or minor.

All thought or thinking is made up of judgments, either positive or negative, that is, they either affirm or deny something. "Lead is heavy." "Feathers are not so heavy as lead." "Steel is high this year." Every one of those statements contains an idea, and every one of those ideas is a judgment of the man who utters it.

Of all the blocks in the way of an able man's progress, happiness, and success, none have been

more disastrous than poor judgment. A man may be able in all other respects, yet his ability counts for nothing because the one element of good judgment, often called common sense, is lacking.

Five classes of judgments. There are five classes of judgments which we will treat, namely, mistaken or false judgments, hasty judgments, prejudiced judgments, illogical judgments, and sound judgments.

1. Mistaken or false: due to lack of trained senses in forming one or both of the ideas combined in forming the judgment.
2. Hasty: due to lack of attention in forming one or both of the ideas combined to form the judgment.
3. Prejudiced: due to lack of consideration for surrounding ideas.
4. Illogical: due to wrongly combining the concepts and ideas that form them.
5. Sound: due to trained senses and logic.

We cannot reasonably blame a man for the first class, unless, of course, he has had a chance to train his senses but indolently neglected it; but, for the second, third, and fourth classes he is to be held strictly accountable, at least so it seems to me as I study this question.

We shall consider the first and third classes in this chapter, and the fourth and fifth in the next.

Mistaken or false judgments arise from defective

or untrained senses. A sensation, as we have seen, is dependent upon (1) the object or thing in the external world; (2) the condition of the body and its organs; and (3) the state of the mind.

Now, as either one of these varies, the sensation will vary. If the mind is excited, angry, half asleep, alcoholized, the thing will not be truly or clearly perceived; if the mind is clear but the body diseased, the thing will again not be perceived as it really is; and if the thing itself changes, the sensations will also change. Imagine the condition when the things are rapidly changing, the body diseased, and the mind excited! Would you trust the judgment of such a victim?

To form sound judgments, therefore, each one of us must bear these three elements in mind and understand the effect of each upon himself.

Training the senses. An experienced sailor can see a vessel in the far-distant horizon which an ordinary traveler can hardly make out with the aid of a spyglass; a watchmaker can in a moment locate the injury to a watch; tea men can detect the qualities of teas by tasting them, even to distinguishing hundreds of varieties; similarly, the smoker with cigars; the tasters of wines become so keen that, it is said, they can tell where the grapes grew of which the wines are made. How delicate is the touch of blind persons!

The experienced merchant can tell the qualities

of goods by his trained touch; the miller similarly learns the differences in the grades of flour; the weight of books, tables, chairs, and other objects, can be told to within the fraction of an ounce by those whose muscular sense is cultivated; the weight of steel ingots, bars of pig iron, steel rails, dynamos, and so on, can be "guessed" to within a pound or two by those whose sight has been trained to detect slight differences in bulk. These all possess sound judgment based upon trained senses.

If all things in the world were exactly alike there would be nothing for the mind to distinguish, there would be nothing to learn, for knowing **one** we should know **all.** The mind itself would perish for lack of change and exercise. We ourselves, methinks, would die of ennui!

The discovery of differences sharpens the senses and intellect, keeps the mind alive, awake, and alert, and trains the faculty of judgment. When you say two things are alike, what do you really mean? You mean that you can detect no differences in them. But another person may see differences, and great ones, for no two things are exactly alike. When you are first introduced to twins you can scarcely tell them apart; but later on, when better acquainted, you can see great differences. All Indians look alike to "tenderfeet," but by and by differences appear.

Since the power to detect differences is such a

vital part of mental growth and activity, it is but natural to take **the smallest difference that can be detected** (the Least Noticeable Difference—so famous in psychology) **as a standard of intellectual ability.** Here is exactly the point where the training of the senses and of attention comes in with such supreme force.

All psychologists call attention to "errors of observation," or "mal-observation," which come in to vitiate judgment and reasoning. These errors of observation are simply errors of the senses, and arise from lack of training. Hence, you see, to get the **higher** truths we must commence with the **lower** agencies, away down at the base of the pyramid; we must train the senses.

Value of trained eyesight. A dyer will easily detect differences in color and tints which will entirely escape ordinary individuals; people who have not studied art or painting are often incapable of noticing even great differences in color; an artist will see color effects and tints in a landscape which will remain absolutely imperceptible to the non-artistic, who may even charge the artist with exaggeration or polite lying! But, after all, whose judgment in these matters would you take?

Now note that every thought we think and every act we perform takes time. Rapid thought and quick action, sound judgment arrived at in a moment by trained senses, sometimes cast the decid-

ing vote between success and failure. A man who can think and act in one half the time that it takes his neighbor to do so, will naturally win mental and material capital twice as fast. He has greater ability, and this is a great commercial asset.

The personal equation. It takes time, I said, for the nerves to act or vibrate. They act considerably slower in some people than in others. Psychologists would say their "reaction time differs." A hundred years ago this was not known, and thereby hangs an interesting story, which I will relate.

Astronomers have to record the exact second and fraction of a second when a star crosses two fine cross-hair lines in the telescope. "In 1795 the British astronomer royal found that his assistant, working beside him with another telescope, at the same time, too, was making his records too late by half a second. Later on this difference amounted to eight tenths of a second. This difference was large enough seriously to disturb the calculations. So the poor fellow lost his position for **eight tenths of a second!** Many years later two astronomers were observing the stars together and recording their passages across the telescope. Strange to say, one was steadily behind the other. Now it would not do to make accusations against a noted astronomer. This set people to thinking. One of the astronomers went to a third astronomer, and again there was disagreement. Finally, after more experi-

ences, astronomers in general reached the conclusion that everybody disagreed with everybody else."

And this is true. No two are exactly alike. Their sensory apparatus, that is, their nervous systems, differ; consequently their images differ; consequently their concepts and judgments differ too.

If we all had trained senses these perplexing and often troublesome differences would nearly all disappear, and we should more nearly see "eye to eye," and feel heart with heart, and the commercial world and all the world would take a stride forward toward the Promised Land of Peace and Brotherhood.

Lay a good solid foundation to your mental pyramid by developing a fine quintette of trained senses, and when you do this, false or mistaken judgments will be scattered to the four winds of heaven. Another troublesome class we shall then have to deal with will be prejudiced judgments.

Prejudiced judgments. Of all the hidden rocks that have wrecked the stately and splendid ship of Ability, none have made a longer and more melancholy record than "prejudice." If we can remove from the channel of our lives this invisible monster, great will be the benefit and joy to ourselves and to others. Let us then earnestly and seriously search for the psychological source and hiding place of prejudiced judgments.

False judgments, as we have just seen, are caused by untrained or imperfect senses. But colored and crooked judgments (prejudices) are caused not by our senses but by our **mental surroundings,** by the images and ideas we already have in our heads.

The origin of prejudice as a mental condition is simply **mental background,** the images and ideas already in our minds into which a new idea happens to fall. The very same idea will look differently to different people simply because the images and ideas they already have in mind color the new one differently. Every new idea falls into a different nest in each mind, and so looks differently to that mind.

For example, out in the street yonder is a crowd of merry boys, having a good time, making a great noise and clamor. A mother sees them, and, remembering the joy her own sons took in such play as these boys are having, exclaims, "Hear that party of merry lads! What a good time they are having!" But a crusty old bachelor across the way, hearing exactly the same crowd of youths, cries out, "Oh! what a gang of noisy rascals! They ought to be arrested for disturbing the peace!"

Effect of different viewpoints. The effect of surrounding ideas is called "viewpoint." We view the same things from different viewpoints.

Two persons see a flash of lightning. One perceives a dreaded engine of destruction and terror, and shows his mind by slamming the shutter and

diving for the feather bed. His formerly acquired images and ideas account quite clearly for such conduct, which, of course, is unreasonable, shows poor judgment, and exhibits prejudice. The other person perceives an electrical display of great beauty and interest; he watches every change of shape or color, marks the time between the flash and the thunderous applause of the skies. He really is delighted with the entire affair. Now mark: As a sensation, the flash is precisely the same in both cases. The difference enters when the image of that flash gets among the other images in the two minds.

There are some dear old ladies and lovely grandmothers who have used Dr. Quack's liver pills all their mortal lives. They recall the occasions when they happened to feel better after taking them. But they forget the many more times they experienced no improvement. They think, therefore, that they have "facts," facts of actual experiences, strong facts, to prove the value of said pills. Possibly their pictures got into the newspaper ads. It is useless to attempt to convince them.

We see, then, that prejudices are judgments colored by the state and quality of the ideas already in the mind. An Englishman discussing England, a mother's report of her son's misdeeds, show prejudice **for**; a rival's ideas of your products, a Democrat's ideas of a Republican candidate, or **vice versa**, are prejudices **against**.

The viewpoint or point of view (ideas already in our minds) has everything to do with the coloring of our judgments, with the bent of our minds, with the tendency of our tastes. Says Professor Witmer, "Our habits of mind make it almost impossible to view political questions from any other standpoint than that of the people among whom we have been brought up."

Two important considerations. In forming our judgments, therefore, we should always bear in mind two things, namely, the disturbance in sensation caused by surroundings, color, or figure, and the disturbance caused by surrounding ideas and feelings lying in the mind. It is like placing a picture in a frame—the picture assumes a different aspect with each change of frame. We should be careful how we frame our pictures! Remember, too many people frame their ideas **just in order** to deceive us, but we can always get at the truth and form sound judgment by looking at the idea **without its frame.**

Study the surroundings. So always, **always** note the surroundings; study background; get at the frame; focus your attention there **first.** Form the **habit** of doing this so that it becomes natural or instinctive to you. Then when anything whatever, large or small, trifling or important, challenges your judgment, the latter will be ready to turn its eagle eye first upon the surroundings, then upon the thing

in question, and thus to arrive at a sound judgment. This we call a "broad" mind—a considerate man.

Let us, then, keep our weather-eye open for these associative effects. Let us always seek for them first, get at them, before pronouncing judgment on any case. Then will our judgments become progressively wiser and sounder; men will see that we are thoughtful, they will feel that we possess some secret of deliberation and of "arriving" very near to the truth—in short, they will recognize and honor our **ability,** and rely upon us in accordance therewith.

The fourth class of judgments—the illogical—are so disastrous that I shall devote the entire next chapter to a discussion of the faculty of reason and the science of logic by means of which we shall be able to avoid the mistakes and troubles which follow the wrong combination of ideas and concepts, and form the fifth class—sound judgments.

CHAPTER VIII

REASONING

REASONING is simply the combination of three ideas in a certain order.

If each idea in itself is all right, then it is in the coupling or combining of them that we should look for weakness in the reasoning.

For example: "Some men are liars"; "John is a man" are two ideas that are all right in themselves. But when I add, "Therefore John is a liar" I am drawing a conclusion, I am combining a third idea, that is not necessarily true. My conclusion is weak, because the coupling is unwarranted, wrong, and misleading.

"This steel is brittle" is an idea, a statement, a judgment, an opinion of yours. "This steel is brittle because there is too much silicon in it" is reasoning. **Reasoning is your opinion with a reason in it, and a reason is a statement of a fact, force, or phenomenon that can be proved by experiment.**

Syllogism. Of these three distinct judgments or ideas which compose the process of reasoning, two must be expressed, one may be implied.

"Corn will be high priced this year because it is scarce" is an example of reasoning where only two

ideas are expressed, but where really three are involved. The mental order of thought is this: (1) Whenever corn is scarce the price is high. (2) Corn is scarce this year. (3) Therefore the price will be high this year. This three-linked thinking is what really went on in the man's mind who made the statement; but, to save time in expression, he simply said, "Corn will be high priced this year because it is scarce."

Reasoning is always, therefore, composed of three ideas. Together they are called a syllogism. Two ideas associate together and give birth to a third which is the child of the other two, and the family is called a **syllogism.** The first idea of the three is the major premise (the father, who starts the whole process), the second idea is the minor premise (the mother), from which is born the third idea, the conclusion (the child)—a child which proceeds **from both** and binds them together; if the union is illegitimate the child is a bastard and carries the name of "Sophistry"; if either father or mother is weak, the child partakes of the same nature and then carries the name of "Analogy" or "Inference."

Sound Reasoning

The intellect of man naturally possesses a logical constitution. It uses the syllogism naturally. Logic does not make the laws of mind; it simply discovers and teaches them. Man did not make these laws.

Mind is under law the same as matter. Realize this; adapt yourself to it; learn the laws and use them consciously, intelligently, gratefully. (That branch of science known as logic investigates all the forms of reasoning, and shows what elements make conclusions either valid and sound, or unreliable and unwarranted, or doubtful and uncertain. We cannot enter into this fully here, as that would require a treatise on logic; but some of the leading laws must be stated and explained, grasped and applied.)

Premises and conclusion. Reasoning is the mental process by which a new idea, statement, or judgment, called "the conclusion," is derived from two prior ideas, statements, or judgments, called "the premises." It is the process by which thoughts of the second degree are formed. (Sometimes the premises are also called the grounds or the data of reasoning—the father and mother in the foregoing illustration.)

A .....Steel
is *is*
B .....Strong
C .....This Thing
is *is*
A .....Steel
Therefore *Therefore*
C .....This Thing
is *is*
B .....Strong

There are really only three **different** concepts in any process of true reasoning, **A, B** and **C**; but each is **used twice in the process,** making six in all.

Of the four concepts in the premises two, **A** and **A,** are identical, and so drop out, leaving the other two to form the conclusion.

Things that are equal to the same thing are equal to each other, is an old axiom indeed. **A = B, C = A;** **A** cancels out, leaving **C = B.** Every act of sound reasoning consists of just this process of handling six concepts.

Where to look first for weakness. Two of these concepts constitute the general truths (major premise), and it is to the general truth we should **first** look when we wish to find the strength or uncover the weakness in any argument or reasoning.

For example: Driftwood and birds with green leaves in their mouths are found only near land; yonder on this sea are driftwood and such a bird; therefore we are near land. Now then, is that reasoning (the reasoning which cheered Columbus, when he approached America), sound or not?

Evidently the first weakness we should search for would be in the first premise.

Is that statement absolutely true, or is it not? A moment's reflection will show that it is absolutely true, for there is no other place on earth conceivable where driftwood and such birds could be found.

Then we proceed to the second premise. Is it true? That depends upon the keenness of the eyesight; but we see that it, too, in this case, is valid. Hence, there can be **only one conclusion** (not one of several as is the case with "Inferences" and "Analogies"), and therefore that conclusion is a **necessary** conclusion, a conclusion which cannot be dodged, denied, or destroyed.

Inferences

We reason consciously and fully, then, whenever the general truth is stated. When it is omitted we are "inferring" and not "reasoning soundly," because we must **jump over the gap** made by the absence of the general truth, and light on the conclusion at the end of the jump. This jump is an "inference." Since "inferring" is a jump, we are never quite sure that we will land where we ought! For example:

Jumping to a conclusion. Because one or two dolls go to sleep or shut their eyes when placed in a horizontal position, will lead many a little girl to "infer" (or jump to the conclusion) that **all** dolls will do likewise. The child does not recognize, you see, the general truth that **all** dolls do **not** go to sleep. The child infers (jumps), she does not reason (walk step by step, sure-footed).

I can infer from a few recalled experiences that on a cold morning in the future a piece of iron will feel colder than a piece of wood. I could **reason** it

out thus: Iron is a good conductor, better than wood; therefore, on the same cold morning good-conductor iron will feel colder than bad-conductor wood.

If the water in a glass pitcher freezes solid, what will happen to the pitcher? What do you "infer" from a few experiences you have had? How can you reason out the same result surely and unerringly?

Inference always gives us, you see, a weaker conclusion than reasoning does. Inference leads to **probable** knowledge, while reasoning arrives at necessary conclusions.

Farmers observe that it frequently storms when the moon changes and so jump to the conclusion that it will always storm when the moon changes. They fail to record the cases when it changes and yet there is no storm. They have **jumped over** these cases in their minds, left a gap, jumped to a conclusion. They make a few cases stand for all. Their inference is wrong.

Where the inference is weak. We learn from Crabb that a conclusion of sound reasoning is full and decisive; it leaves the mind in no doubt or hesitation; it puts a stop to all further reasoning on that point; it leads to a conclusion that is sure; but an inference is partial and indecisive, it is drawn from the appearance of things, as when we infer from the thickness of the clouds and heaviness of

the atmosphere that there will be a rainfall or snow; yet we may be mistaken.

Sound reasoning, then, leads to **necessary** conclusions, to conclusions which cannot be escaped; but an inference is not a necessary conclusion, it is only **one of several** conclusions that might be drawn from exactly **the same** premises.

For example, you notice a pool of water by the roadside this morning and you say, "It rained hard last night."

This sentence is your expression of a judgment derived by an inference, for which your reasoning runs something like this: "Previous rainfalls have, to my knowledge, left water standing in pools. Here is a pool where none stood last night; therefore, the most probable cause of this pool is a downfall of rain."

But this conclusion is not a necessary conclusion, simply because that pool may have been caused by something else, such as a burst water pipe in the vicinity, or a city sprinkler, or a drilling fire company.

Bridging over a gap. In every inference we are asked and compelled to **take some things for granted** —to **believe** some things without evidence—to jump over them and land on the conclusion anyway. We run to the end of the line of things we can prove, and then come to a gap—things we can't prove—and are asked simply to believe that they are like

all we can prove—we are asked to take them for granted, and so we jump directly from the end of the line of provable things over the gap of the unproved to the conclusion, thus:

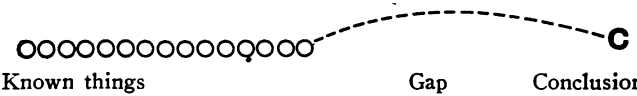


FIG. 12

The less the distance we have to jump the stronger or more probable the inference becomes.

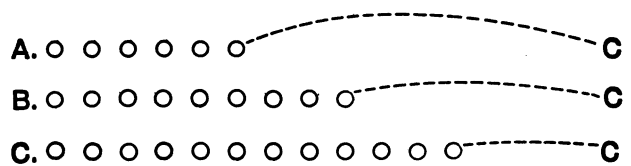


FIG. 13

In Fig. 13 inference **C** is stronger than either **A** or **B**. If three men in New Orleans have the yellow fever and John lives in New Orleans, the chances of his getting the disease are slim; but if twenty-five thousand men have it, the line of cases reaches nearer John and the jump to the conclusion is much shorter, so the inference that John will get it is much stronger. Yet it is not absolutely sure that he will get it even then. But, in inductive reason-

ing, the conclusion ordinarily becomes stronger according to the increased number of cases or particulars upon which it rests or from which it is drawn.

I cannot prove by sound reasoning that the planet Mars is inhabited, for the line of known facts does not reach that far; that line stops short, leaving a gap over which I must jump to reach the conclusion that it has inhabitants. Hence it is purely and simply an inference—one, however, in which I personally believe. You may not, and still have just as good a line of known facts (data, grounds, reasons) as I have for believing as I do. Inferences and analogies are, thus, never conclusive.

Inferences may be strong. Yet inferences may be exceedingly convincing. If the line of known facts reaches almost entirely to the conclusion, the inference is exceedingly strong. For example, do you know for certain that all other people on earth have thoughts and feelings any more than a machine has?

"Yes, certainly," you reply.

But **how** do you know that?

Simply and solely by an inference, namely:

1. All persons are fundamentally alike.
2. All persons I ever saw had thoughts and feelings.
3. Therefore absolutely all persons have thoughts and feelings.

The first statement is the general truth upon which the conclusion heavily rests; but you are not and cannot be absolutely certain that all persons on earth are fundamentally alike **until you have seen and studied them all.** You have seen only a few of the total number in fact; and you jumped to the conclusion from these few known instances over the unknown to the conclusion. In this case, however, that general truth, that major premise, has all history and the evidence of all other persons besides your own evidence to confirm it, and it has the negative evidence also that no person has ever seen a machine with thoughts and feelings. It is an inference, but a very strong one.

We are commonly unconscious that we are inferring. "That is a railroad train coming this way," you exclaim on hearing an increasing rumble. You jump from a sign to the thing signified. But that increasing rumble may be caused by a trolley car, an elevated train, or a heavy coal wagon.

The value of inference. It is both well and ill that the mind thus makes inferences. First, well, because if we had to pause and distinctly reason out by syllogisms our every action, we should have been killed long ago. I hear a certain sound back of me on the street and instantly jump aside and just miss being struck by an automobile. I instantly inferred from the "honk, honk" of the horn that it was near me. Had I paused to reason it out———!

Reasoning is voluntary; inference is involuntary, spontaneous, a short-cut to decision and action.

Secondly, inference is ill, because we too often jump to conclusions when we should take time carefully to reason them out.

Analogy

Analogy is an inference drawn from a slight or superficial resemblance between two or more things.

Basis of sound analogy. Reasoning by analogy leads to sound and valuable conclusions when **essential** similarities are compared and discovered, but in such reasoning unscientific or untrained or thoughtless persons do not analyze sufficiently to get at essentials; consequently, non-essentials lead them astray to false conclusions.

Analysis is one of the important processes distinguishing reasoning from inference or analogy.

In analogy reasoning lacks the presence of a strong general truth or else lacks the general truth altogether, as for example, "This man is from the same state and has the same kind of an eye as the man who swindled me last year; therefore this man is a swindler." This is reasoning by analogy, by superficial resemblances, and loses sight of essentials and of the general truth, that only some men having that kind of an eye and coming from that state are swindlers.

In all primitive language men moved their fellows and expressed their own thoughts by a free use, a picturesque use, of parable and simile. "An empty sack can't stand upright," was their argument (by analogy) to prove that all men in debt would surely collapse. But it does not **prove** it; it is not a necessary conclusion, for almost all of us have been in debt—pocketbook empty, bank account gone, and yet we are alive and well and solvent to-day.

Many persons use analogy and never themselves know its weakness. If they are intelligent enough to understand its weakness and still use it upon others then they are guilty of sophistry.

Sophistry

Sophistry is the **intentional** use of the two weak forms of reasoning, inference and analogy, to deceive.

He who indulges in sophistry is shrewd but dangerous, keen but cutting, educated but unprincipled. He knowingly employs logical depravity, and such use of it becomes also moral depravity—in short, dishonesty, trickery, deceit. The sophist cannot use sound reasoning, for sound reasoning can never deceive or mislead.

Mistakes in reasoning are made by failure to notice differences between **nearly** similar objects, **nearly** similar qualities, **nearly** similar classes. "Failure to notice" is traceable to lack of sense

training, lack of careful and complete observation, lack of thorough comparison and analysis.

Now then the sophist (and oh! the world is full of sophists) understands this weakness of human nature, realizes this lack of nice discrimination on the part of the average man, and so consciously and deliberately employs their own mistakes of reason to mislead the very men who unwittingly make them. The sophist makes them believe that inference and analogy is absolutely sound reasoning; he resorts to claptrap arguments, to inconsequential syllogisms, to specious pretexts, and thousands fall willing and helpless victims.

How to guard against sophistry. Therefore, with earnest emphasis, we say to one and all: Study these fundamental forms of logic, these root principles of reasoning, that you may be able to defend yourself by uncovering the weak spot in your antagonist's argument and parry his intellectual blow by the shield of sound reasoning.

Whenever a statement is made in your hearing which is intended to move you personally in any direction, to or from any course of action, always ask yourself this mental question: Upon what syllogism is this statement of his based?

Break the statement up into its syllogistic threefoldness, and then carefully examine the major premise and the minor premise. If you find no weakness in either, then see if the conclusion really

and necessarily follows from them, or whether some other conclusion could as readily be drawn, or whether the conclusion is entirely unwarranted.

This habit of analysis will be your safeguard, your strength and your glory—a commercial asset of the highest value.

Methods of Sound Reasoning

1. A priori reasoning. Given the cause, we can reason **forward** to the effect. For instance, if you tell a steel man what per cent of carbon there is in your steel, he can tell you the degree of hardness, tenacity, and ductility that your steel will possess. Reasoning from cause to effect is called **a priori** (forward) reasoning.

2. A posteriori reasoning. Given the effect, we can reason **backward** to the cause. If a steel man observes the degree of hardness, tenacity, and ductility which your steel possesses, he can tell you the exact cause of it, namely, a definite percentage of carbon. Reasoning from effect to cause is called **a posteriori** (backward) reasoning.

3 and 4. Inductive and deductive reasoning. We may reason from principle down to sensations; this is deductive reasoning. Or we may reason from sensations up to principles; this is inductive reasoning. In deductive reasoning we reason from one general principle to many particulars, applying the principle to each particular; in inductive rea-

soning we reason from many particulars to one general principle, placing each particular in it.

Philosophy reasons deductively; it begins with a general principle and then tries to explain phenomena by that principle; it runs from the top of the pyramid of thought to its base.

Science reasons inductively; it gathers its facts first, and then from them arrives at laws and principles. It runs from the base to the top of the pyramid.

In adult life most of us naturally use deductive reasoning. We take the laws and principles with which science has furnished us and show how they apply to the particular case in hand. The larger the number of laws or general truths we know, the stronger become our thinking and our arguments. If we can refer every statement we make back to or up to some general law or principle, we are powerful thinkers and strong in influencing others through the intellectual processes.

To give a clear and sound reason for one's statements and conclusions is everywhere recognized as a mark of thoughtfulness and of power.

Cultivate it. You can.

Simply try to relate any statement you make—especially turning-point statements, those you want to make especially convincing—to some one general law or principle, for under its protecting shadow your statement will stand impregnable.

An important word in conclusion. There is one fundamental process in all reasoning, and that is the process of **comparison.**

Comparison, the Basis of Sound Reasoning

Why cannot all persons reason alike, that is, soundly? Because sound reasoning is based upon the perception or discovery of **essential** similarities, and not upon slight or superficial similarities as is done in analogy. Sound reasoning consists in seeing essential and real similarities—associating two things together which are really similar in one or more features.

To see this similarity requires a certain skill or sagacity, a sort of gift; but do not feel discouraged, for that sagacity is born of attention, comparison, and observation. Attention, comparison, and observation will and must discover similarities. We have already studied attention and observation; now let us dwell a moment on **comparison.**

Exercises in comparison. What do you do when you wish to discover whether two things are alike or are different? You attend to one carefully for a while and then to the other, and perhaps repeat this process many times before the likeness or unlikeness is really or clearly observed. This is comparison.

When at last you perceive the likeness between two or more things you have reasoned it out; it

is not a mere inference or analogy, but the result of careful comparison. The similarity is a **fact** and **not** a fancy.

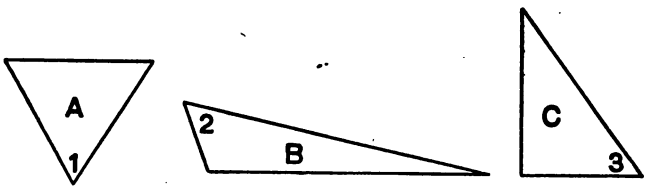


FIG. 14

Are these three figures in Fig. 14, marked **A, B, C,** exactly alike in any respect whatever?

"Yes," you say; "each one of them has three sides. They belong to the concept 'triangles'."

"True," I would reply, "but no two of their sides, much less the three of them, are exactly of the same length." Are all the three figures exactly alike in any respect whatever?

At first glance a thoughtless person would say, "No, they are not exactly alike. The fact is, they are entirely different, different in size, in shape, and in every respect."

But let a **reasoner** come along, and he will at once begin to **compare** these figures in every conceivable combination. A reasoner would compare all the nine lines. He would compare the direction of the lines. Then he would compare all the angles, and lo! when he came to the angles he would find

that one angle in each figure is exactly the size of one angle in each of the other figures, namely, the corners or angles marked 1, 2, 3. They fit each other exactly. (If you cut these figures out of paper you can fit them together and see for yourself that angle 1 exactly fits angle 2 and that each of these fits angle 3.)

If each angle is sixty degrees they can all be arranged in one group, thus:

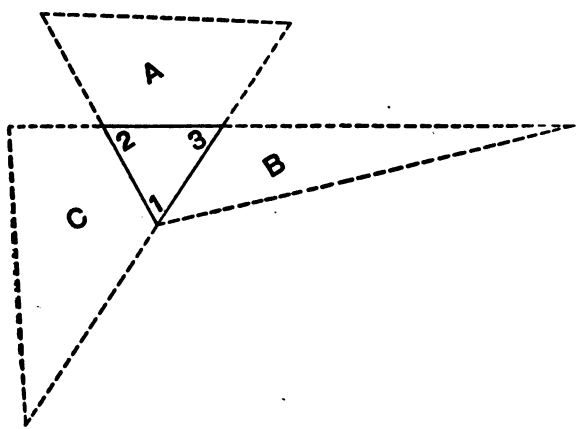


FIG. 15

We have now found an essential similarity, something really belonging to all three triangles. That inner triangle, equal in sides and equal in corners, stands out from all, though a part of all—the simi-

larity comes out from all the dissimilarities. Then we say, "I see it. I understand it," and we feel at rest, satisfied, because we have reasoned it out, and reasoned it in—out of the problem and into our heads!

Detection of similarities and differences. The mind in which is this habit or tendency of associating things together in various ways in order to extract their points of similarity is the mind most strongly rational, most strongly tending to reason things out.

By comparison, then, we learn, reason, and discover laws, and build mind. So get the habit of comparison. And in your comparing be sure not to be captivated by superficial resemblances, do not be misled with slight likenesses, do not become intoxicated with easy or obtrusive similarities; look deeper, compare until you discover essential similarities, until you see abiding and unchangeable likenesses, harmonies which any other man can see and not deny when you point them out to him.

Cultivate this habit of thoroughness even in little things, and it will be your glory and strength in great things. Great things don't come to us every day, but little things do. Be thorough in them, lend them the force of your reasoning faculties. Such a habit really and surely means money in your pocket, friends in your hand, and joy in your heart.

The senses once more. Some men can reason

better on one subject than on others. Why is this? Because they have more ideas on that subject than on others. (Each act of reason, remember, consists of three ideas.) And why do they have more ideas? Because they compare and combine more concepts. And why do they have more concepts? Because they have more images derived from the alert and constant exercise of their seven senses in that particular line than in any other line.

Practice makes perfect, not only in manual training but in mental training as well.

So again we say, train your seven senses so that when you compare things you will be able to notice smaller differences and perceive more essential similarities in the things you handle in your trade or profession than do all the untrained persons around you.

CHAPTER IX

LAWS AND PRINCIPLES

Laws, or Thoughts of the Third Degree

HOW the mind apprehends laws and principles has already been explained in Lesson Four, but let us continue the subject for the sake of emphasis.

By thousands of observations and experiments made by different observers we know that cold increases magnetism. Cold causes metals to contract, to shrink together as it causes us to do, and so brings the little molecules in the metal closer together, and then it is easier for the magnetic current to pass along, for it will jump over the short distance between molecules **a-b**, more easily than over the longer distance of **a—b.**

This statement, "Cold increases magnetism," is, as you will recognize, a major idea.

By thousands of other observations we know that "rivers cut channels through softest strata," another major idea.

"Meteors fall toward the earth" is still a third major idea.

Now then, these three ideas alone would be sufficient to reveal a law, or thought of the third

degree, something common to all and belonging to each, and that law is, "Forces act along the line of least resistance."

Laws rest upon many judgments and ideas. This is a statement that puts the roof on the other three —it covers them, it embraces them. Many other observations lead up to the same law. In short, that law rests upon millions of sensations, hundreds of thousands of images, tens of thousands of concepts, and thousands of ideas. Thus two or more ideas unite to reveal a law.

In an exactly similar manner we arrive at other laws.

Principles, or Thoughts of the Fourth Degree

Concepts, ideas, and laws belong to the domain of science, or organized, classified knowledge. They deal with the **what** and the **how** of all phenomena.

A law may be natural or man-made; it may be discovered by observing that orderly sequence of phenomena known as cause and effect or by inductive reasoning; it may be related to physical phenomena or to mental and social phenomena, or to the rules of conduct in organized society as established by custom and authority, and so on; but in all cases, **a law is a rule of action.** A law states the **what** and the **how** of nature-made and man-made relations and activities.

Principles lie in the unseen background of laws and are the foundation, or reason, for the existence and manifestation of laws.

By research in the highest realms of thought, true principles when found are seen to explain the eternal question asked alike by the child, the unlettered, the superficial thinker, the scientist, the scholar, and the wise man: "Why?"

To formulate the answer to this question, "Why?" as to the nature, scope, and mode of operation of each law governing **the what** and **the how** of phenomena in any grand department of the physical, mental, moral, economic, social, industrial, commercial, and business world, is to think and discover principles; thus a principle is of a higher degree of thought than a law, since it gives a reason for the manifestation and operation of two or more laws relating to a class of phenomena.

Principles are the axioms, theorems, and theories of philosophy; laws are the rules by which Nature works out her problems in science and by which man as a social being endeavors to improve himself. Every law in Nature has behind it a principle or reason justifying and exemplifying the existence of the law.

In the science of successful business building Confidence is the fundamental principle of trade.

The principle of relativity. Atoms exhibit attraction and repulsion, and by both of these forces

express their dependence on other atoms—they are drawn toward other atoms or fly apart from them; they move along the lines of least resistance. Thus **relations** are established among them everywhere in Nature.

The law of cause and effect similarly establishes and exhibits changes in the relations among atoms and of all things which are composed of atoms; so that the mind at last, on the basis of these as well as other laws, perceives something that is higher than any particular law, it perceives something in all things, a "principle," the principle of **relativity,** which shows that all things stand in relation to each other—they do not stand alone.

"No man liveth unto himself," and no thing either. All are in mutual dependence—a wonderful truth involving so many important things and thoughts that we cannot begin to name them here. Think them out for yourself. Apply this principle to all business, society, science, art, brotherhood. In this principle we see the solidarity of humanity, the unity and continuity of law.

Some other principles. As we arrive at the Principle of Relativity, so we arrive at the Principle of Law (law in the universe and in every part of it), the Principle of Good (good in the universe and in every part of it), the Principle of Beauty (beauty in the universe and in every part of it), the Principle of Love (love in the universe and in every part of it), the Principle of Life (life in the universe and in

every part of it), the Principle of Service (service in the universe and in every part of it).

In short, the mind that reflects—turns back upon its own images, concepts, and ideas—enters on a field of generalization entirely unknown to an ordinary or unthinking mind, one full of astonishing results; such a mind begins to perceive the real nature, growth, and contents of mind and discovers the highest of all mental fruits, the laws and principles—the truths "that sit supreme on the throne of life"; thoughts of the third and fourth degrees.

The process of reasoning consists in the proper grouping or union of three ideas, and by reasoning we not only arrive at judgments but also at laws and principles. Let us briefly explain the reasoning process as it applies to laws and principles.

How Laws and Principles Are Discovered

The first premise in the ordinary process of reasoning consists usually of only one statement; but it **may** consist of many statements—that is, of many ideas—and yet remain truly and soundly the first premise in the reasoning process. For example:

1. Apples fall to the ground; rivers cut channels through softest strata; balls roll more swiftly down the smooth than the rough side of a board; cold increases magnetism.
2. All these are manifestations of forces.

3. Therefore forces act along lines of least resistance.

You perceive, therefore, that the fundamental form of the syllogism is revealed and maintained in arriving at a law. The mind naturally works in this way in all its higher intellectual processes. Hence reasoning consists in the grouping of two premises and a conclusion, three parts, the first of which may be indefinitely extended by case after case, fact after fact, idea after idea; then follows the second premise, and lastly the conclusion. The rule of three underlies the whole process.

After the same fashion (or form of three parts) we arrive at principles; only here, in the first premise, we employ as many laws or major ideas as possible. For example:

1. The law of attraction causes readjustments among objects; the law of repulsion causes things to move along and against other things; the law of cause and effect produces changes in the location of objects or parts of objects; electricity makes things change places; steam propels.
2. All things are thus being ceaselessly thrown into varying relations among themselves.
3. Therefore, relativity is a universal principle. The process is not always formally gone through with; but it is, nevertheless, the form, rule, or method which the mind instinctively follows.

Power through knowledge of laws and principles. Professor Kirkpatrick says: "The certainty of a fact or statement is very much increased if the fact can be connected with some law of more general application." The following diagram (Fig. 16) will make all this clear:

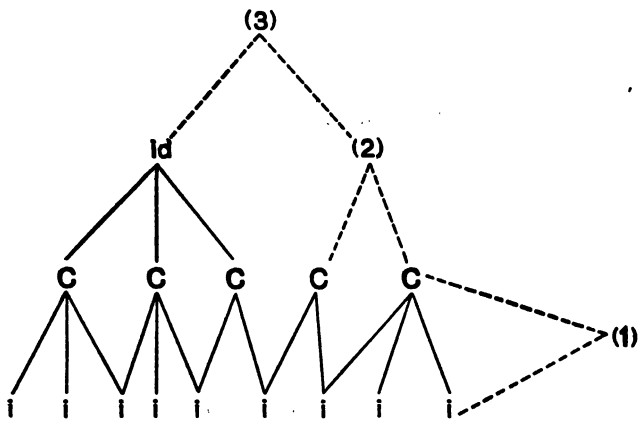


FIG. 16

You see (1), a minor idea, stands under and is covered by the force of (3), which is a law, that is a much bigger and stronger idea, yea, laws are **giant** ideas, so that many more facts can be brought forward, if necessary, to confirm your statement (1). This body of "other facts" makes you feel strong and sure when stating (1). This inner strength which you feel is confidence—confidence born of

knowledge. It ripens into that **faith** which Mr. Sheldon has defined as "the soul quality of certainty, born of knowledge **ripened** into realization."

Let us still further illustrate this important and intensely practical point.

Suppose I should say, (1) "I saw a star fall toward the earth"; this is a minor idea, for it states a relation between an image and a concept. That statement is fortified by (2), "Stars fall toward the earth," which is a major idea; and that is fortified by (3), "Forces act along the line of least resistance," which is a law.

Any one can see that these three different statements are not equal in force or scope, but that there is progression from (1) to (3), the sense and meaning constantly enlarging and becoming more and more comprehensive and stable.

Hence we say that whenever you can refer any statement (1) back to a general law (3) you powerfully fortify and confirm that statement.

Men will **believe** your statement that you saw a star fall to earth, because stars do fall to earth, and they do because forces act along the line of least resistance. But, if forces did **not** act along the line of least resistance, then stars would not fall to earth, and if stars do not fall to earth then you would have a great time indeed to convince any man that you saw one star fall.

We repeat: If you can rest every pivotal or cen-

tral or important statement you make in the bosom of a general law, you are strong as adamant, invulnerable and unanswerable. You compel assent.

Here are two laws, easy to see and understand, to which you can refer your statements: 1. Forces act along the line of least resistance. 2. Forces are equal and transformable, that is, when one force seems to disappear it reappears in another form or in two or more forces the sum of which equals the original force. This is one instance of the law of conservation of energy, the law that "cause and effect are equal."

CHAPTER X

ATTENTION

WHY is it that some people on coming home from church can tell the text and the divisions of the sermons while others cannot, but the latter are able to describe in accurate detail the bonnet or dress Mrs. Smith wore?

Try to draw the outline of the state you live in or that of the United States. Just pause and try it. You will realize with humiliation that you do not really know these outlines as correctly as you thought you did, and that you must much more attentively study the map to get the outline correct or nearly correct.

Draw the leaf of an oak; then go out and examine a leaf; then try the drawing again, and note the improvement, due largely to **attention.**

Can you, from memory, draw the outlines and proportions of an ingot of steel, such as you saw or handled yesterday?

We all recognize old friends, but how few of us could describe them in such a way that the description would be individual and not represent a hundred people. You see we fail to observe differences

closely; we fail to be attentive to proportions in features, color, dress, and so on.

Some persons have cultivated the art of observation and attention to such a fine degree that when they meet a stranger for the first time they can afterwards describe the color of his eyes, hair, whiskers, dress, the peculiarities of his mouth and nose; in short, give a clear and minute word picture of him. This simply means intense attention and trained sight.

Attention defined. We define attention as the mind directed to one thing to the exclusion of other things. The word itself indicates this. It comes from two Latin words **ad,** "to," and **tendo,** "reach," or "stretch," thus taking its meaning from the turning of the body toward anything in which one is interested.

Attention consists not in turning away so much as turning to; if we turn to one thing fully, we shall not need to bother about other things—they will go away of themselves.

Sit in your chair in your room and for a period of fifteen minutes name all the things you see, hear, touch, and smell. These things were there all the time, but as you named them you were distinctly conscious of one, then of another, and so on. You were not conscious of **all** of them **at once.** When, for example, you looked at and named the

table in front of you, did you not almost become **unconscious of all the other things** that were affecting your senses?

"Watching." As simple a word as any to explain attention is "watching." Attention is simply the mental act of watching, watching something going on outside of the mind, or inside of it. The mind can watch itself, or watch something else.

Watching is the simple secret of perception and observation, and observation is the grand secret of learning, the secret of filling in useful knowledge.

Watching is not simply looking, but looking **to see.** Professor Scripture graphically puts it thus: "Eyes and No-Eyes journeyed together. No-Eyes saw only what thrust itself upon him; but Eyes was on the watch for everything. Eyes used the fundamental method of all knowledge—observation, or watching."

Attention, then, is one of the most intensely practical things to be acquired in all the art of thinking. Without it we can do nothing. With it we can do almost anything. It supervises the whole business of mind building and mind using, and must never leave the work until it is finished.

Two kinds of attention—voluntary and involuntary. Things, events, duties, the world, seem in a mad rush and whirl around us. Some things in this roar and rush interest us. They attract our attention. Other things there are which my reason tells

me should have my attention when they might naturally **not** attract it themselves. The former is involuntary; the latter, voluntary.

Involuntary attention is the kind appealed to by all advertisements. They are intended to attract attention, without claiming, demanding, or commanding it. But voluntary attention is the kind we must have if we would do our work well, and is the thing we are after in this lesson. Involuntary attention is usually controlled by something (sight or sound) outside of the mind; voluntary attention by something inside of it, by effort and the command of the will.

"We sit down to read," says Brooks, "and in a few moments find ourselves dreaming, or pursuing a rambling train of thought, unwilled and unwished." The attention has departed from the book and flitted over to something else. This is involuntary attention. Involuntary attention is a puerile state of mind, easily diverted, led off by a bauble like a thoughtless child; the mind just floats from one thing to another without direction or control; it drifts. We don't want to "drift," we want to steer. It is almost needless to state that it is voluntary attention which we wish to cultivate as a business asset.

Finally, **never do anything without attention.** Brooks well says that glancing hastily and carelessly over books or newspapers tends to weaken

the powers and habit of attention. Novel reading as often practiced by young people is especially injurious in this respect; they rush along over the pages merely to gratify a curiosity as to how the story will end.

A few good books thoughtfully and thoroughly read will be infinitely better in all respects (for attention, memory, and reason) than many skimmed over. Whatever is worth your while doing at all is worth doing right, with your **whole attention.** Even if it is in itself a trifle, apparently, but belongs as a necessary part of your work, focus your full attention upon it, and then pass on to the next. Never decide to do one thing and then, the very next breath, waver and get at another. Work will save you from worry, for when you work you are doing something with your whole attention absorbed in it and in every detail of it; consequently you forget your worry by getting work for it. Then work becomes play. Work should be the play of adults.

CHAPTER XI

TRAINING POWER OF ATTENTION

Expectant Attention

YOU must understand this point if you wish to control yourselves and move others with greater ease. So we dare not omit it.

Exercise 1. Count the letter "m's" you see on this page. Have you done it? If you did, did you notice how the other letters passed in a sort of dim or obscure procession, while the "m's" caught your eye? Why was that? Because you **expected** to see the "m's" singly, you prepared for them, you held the image of the **m** in mind so that whenever a figure like the **m** came along, **image and external** figure met, which union made the **m**, each one, stand out vivid and distinct. When you help to find a lost object you always get the owner to describe **how it looks** before you begin the search. This awakens expectant attention; you have an image of the lost thing in mind, which helps you to recognize it quicker. When we expect something new is about to happen, or something important, how razor edge is our attention! The attention of a class in school can be held much easier to a map that is **being drawn** on the black-

board than to one that is already drawn and complete when they get to the board. The attention of a prospect is much more easily held when you write, figure, or draw something before his eyes.

Exercise 2. Look at Fig. 17. You do not see a book, but simply a drawing which reminds you of a book, makes you think of a book; that is, you refer this figure to that class of images (a concept) in your mind which it most resembles. This

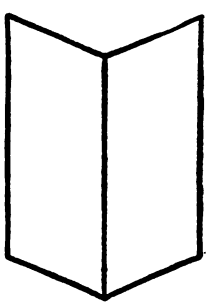


FIG. 17

drawing could never remind you of an elephant, a star, or a snake.

But let us look at this drawing more closely now and watch the twofold effect it has upon us, for it gives rise to two opposite mental images: (1) a book with its back toward us; (2) a book with its page-side toward us. There is absolutely no change in the drawing, of course. The change, then, must

be entirely in our mind's eye. How do you explain it?

Here is the explanation, which, in view of all that we have studied up to this point, becomes entirely simple and clear: **The images we class it with differ** (which causes it to look different every time we pass it mentally from one class to the other). There are two classes of images in our minds which are distinctly like this drawing, and so at one moment the mind classes it with one and the next moment with the other set. If we had never seen books open in any other way than their page-side toward us, we could not now see anything else in this figure but that.

But we have seen many books open with their backs turned toward us. Hence we have **two sets** of images in our minds about books, and naturally expect this drawing to look like one and then like the other. Indeed, we can control it by expectant attention: Expect it, in a moment, to show the back of the book, and lo! it obediently does so. Then **change your mind** and expect it to show the page-side; and forthwith it again obeys your mental summons.

Exercise 3. Read the preamble to the Constitution of the United States as printed here: "We the people of the United States, in order to form a more prefect union, setadlish justise, insure domastic tranpuillity, provide fore the common defense, pro-

mate the ganeral wellfare and secrue the blessings off liberty too ourselves and onr postreity, do ordian and establish this Constitution for the United States of America."

The first time you read it you expect it to read right, to be printed right, and to be all right; so you fail to note all the errors.

Now, read it a second time, expecting to find the errors. And you will. Count them.

But then a third time go over it, **letter for letter,** thoroughly this time, in detail, counting the errors again, and you will be surprised to find that the number of errors detected goes on increasing, just as your expectant attention gets more and more definite and concentrated on details. (I know the exact number of errors in these lines, and I have never found one who detected them all the first time he read it.)

The **mental preparation** for a particular sensation is the important element in expectant attention.

So powerful is expectant attention, and so much has the mental preparation to do with it, that frequently the most marvelous and surprising transformations are caused by it—black can be made to appear white, high low, and cold hot. Yes, things that are ice cold can actually be made to appear too hot to swallow when we **expect** them to be hot. Did you ever eat baked ice cream? The cover or crust is hot and the ice cream within is, of course,

cold as ice. The first time I encountered this delicacy of the culinary artist I blew a teaspoonful of it as I held it ready to place in my mouth! And when I timidly and tenderly tasted it to see if it was cool enough to put to my tongue, it really felt so hot I jerked away! I would have taken an oath that the stuff was really and actually hot.

"Forward—**march!**" "Right—**face!**" "Shoulder—**arms!**" The first word of each military command arouses expectant attention, attention focused on something **about** to happen, mental preparation for the next thing, so that when it is executed it is executed with precision, promptness, and power.

We can arouse this state of mind in ourselves or in others. This constitutes part of our ability as thinkers, and as movers of men. We are concerned in this lesson with its effect upon ourselves, so we give one more experiment. (Its effect upon others and how to use it is another matter, and belongs to the law of "Suggestion.")

Exercise 4. Make a different figure or drawing on five sheets of paper, a square on one, a circle on another, a triangle on a third, and so on. Make the figures of equal size and distinctness. Have an assistant select any one of these papers, and go off to the extreme end of the room, stand there with it turned toward you, and then approach you slowly as you fix your gaze upon it.

When you first see **something** on the paper but

cannot tell which figure it is, stop him, and have the distance from you measured; then let him continue his approach and at the point when you first recognize the figure, stop him, and measure that distance. Do this for each of the five papers. Let the assistant select the order, so that you do not know which paper will come next.

When you have all the distances marked, dismiss the assistant and experiment with yourself as follows: Fasten up each paper yourself, go back from it and approach slowly, marking the point when you first notice something on the paper, and then when you can recognize which figure it is. Do this for each of the five. And now when you compare the distances at which you could recognize the figures in the first set of five experiments and in the second set, you will find that in the second set you could recognize them at **greater** distances.

Can you tell why this is so? Simply because in the second set you knew which figure to expect. You knew, because you hung each one up yourself. You were prepared in mind to see **that particular figure.** You mentally imaged it. By measuring the distances you have mathematically measured and determined by actual experiment **how much** expectant attention has really helped you: It shortened the distance you had to walk, saved you time thereby, and enabled you to arrive at the truth quicker.

It helps us, therefore, to plan for our work, to prepare for what we are going to do or try, and inspires us to push earnestly forward, **expecting** nothing but success.

Divided Attention

Must we use attention to do everything? Can we do anything without attention?

Have you not often observed a friend playing a piece on the piano or organ and yet carrying on a conversation at the same time? Yes, you certainly have seen this. And while it looks as though the piece was played without any attention, it really is not so. The fact is that the total attention of the mind under such and similar circumstances is divided, not equally perhaps, but in such a way that part of it runs to the playing and part to the conversation.

Divided attention not inattention. We can notice the sensations of fragrance and cold at the same time. The attention does not fluctuate from one to the other but abides upon both. You can hear four voices in a quartette at the same time. You can see more than one person in the room at the same time. Attention may not be equally divided between these objects of sound or sight, but it is divided. The attention is not on any one single thing in the room when you are looking at or thinking of the room **as a whole,** or listening to a quartette as a whole, as a

unit. An engineer could not control his engine if it were impossible for him to attend to or think of more than one thing at once or work only one hand at a time. Sir William Hamilton, the great philosopher, thought he could attend to six things at once.

So we see the truth that divided attention is not inattention. In focused attention we bring the mind down to a small detail; in divided attention we limit it to a larger area. In divided attention it is not scattered or lost, but limited.

Experiments in divided attention. Now let us see when we can divide it and when we can not. Let us see if there is a law of mental action on this point. I want you to discover this law of your mind yourself, and so go on with the experiments:

Exercise 1. Repeat the little poem, "Mary had a little lamb," and as you repeat it write out with pencil on paper a simple problem such as 6 plus 3 multiplied by 10 equals 90. You will find that you **can** do both at once and thus divide attention between the two processes.

But try this: Repeat, "Mary had a little lamb" and write, "Jesus, lover of my soul"; you will find that attention leaps from one to the other and will not, can not, abide upon both simultaneously, so that when you write a word of "Jesus, lover of my soul" you will have to pause in the reciting of the poem until the word is written.

Exercise 2. Roll a sheet of typewriter letter paper

(or paper of that size) into the shape of a candy horn or cornucopia; make two of these, one for each nostril (the small end is trimmed off to fit the nostril); place one in each nostril, and at the wide end of one place a rose, with a carnation at the wide end of the other; try to smell both at once. We can't do it; but we can smell either one in preference to the other by simply thinking of it, that is, by turning our attention to it, a purely mental act. It thus passes in and out of consciousness by the silent-swinging door of attention. But, while smelling one flower we can notice a touch on the hand, or listen to singing, or watch a fly crawl across the table.

The law of divided attention. The law is this: Attention cannot be divided between two acts of the same sense or of the same order—such as two multiplications, two recitations or reciting one poem while writing another, or listening to two quartettes singing different selections at once. But it can be divided between acts of different senses or different orders.

If you remember this law it can be turned to helpful and very practical account in your business dealings with your fellow men. If, for example, you are showing land, or steel rails, or goods of any sort to the eye of a customer, remember that a sound will more easily and readily disturb his attention (although his eyes are fixed upon yours) than the

sight of other things in the place, and so, after the sound has passed, deliberately call his attention back to the point at which you were interrupted; if you are exhibiting a musical instrument and your customer is listening, the sight of a moving thing in the room will very readily distract your customer by dividing or diverting his attention, so call it back before going on with your selling talk; if you are selling flavors and a customer is tasting them, a noise or some object passing before his eyes will very likely wean away his attention from the palate.

So remember that when you've got one sense going the others are quiescent, restrained, kept down, suppressed—but are ever ready, like lads in school, to burst out, to spring into instant action on the slightest opportunity. Guard the one you wish to keep going by definitely and deliberately driving disturbances out.

Right and wrong kinds of attention. It is well that we do not have to attend to all the stimuli reaching us at any given moment. I think it would drive us mad.

Attention keeps us sane.

Permanent inability to attend is insanity.

Mind wandering is weakness.

Millions of items of the outside world—sounds, sights, touches, changes of temperature, colors—are present to my senses but never really become a part of my experience or memory because I do

not give attention to them, I am busied with something else, and so they go streaming by me with a whirl and a rush. It would be maddening if we were compelled to attend to all as the entire panorama speeds by. My **experience** is only the small portion of the total whirl which I attend to.

Attending to things fully and masterfully one at a time as they meet us in our duties keeps us sane, for when we attend to one thing fully we shut out all others. It is a great blessing to be able to do this. Suppose we had a front door but could not shut it—open, helplessly open for every stranger, animal, or insect to come or go as it pleased!

It is a splendid ability to shut up at times, and so shut out all things but one—the one we want. Hearty work prevents heady worry.

Diverted Attention

Absent-mindedness is simply diverted attention that is involuntary, unintended, and uncontrolled.

Mr. Beecher was once examining a beautiful pebble along the seashore and took out his watch to see what time it was. He then had both pebble and watch in mind and in hand. As he walked along, his mind ran on to some other subject and he finally threw the watch into the ocean (thinking it was the pebble) and put the pebble into his pocket (thinking it was the watch). There was a moment or two when pebble, watch, and that third subject

of thought were all in his mind at the same time; but as that third subject attracted more and more of his attention they got less and less until they got so little that Beecher failed to distinguish between them; thus divided attention passed over by insensible degrees into diverted attention.

Why do we not notice the ticking of the clock which is ever present with us, or the rumble in the street, the roaring of the lake or ocean, the din of the foundry, the hum of the factory, the spectacles on our noses if we wear them daily, the spots *(muscae volitantes)* before our eyes which are there always, the pressure of clothes or shoes, breathing, beating of heart, or the headache if we have it daily, or tastes in the mouth? Not because our senses to these things become dull or blunt, they do not; but simply because other things divert our attention away from them. We are more vitally interested in other matters than we are in these common, regular sounds and occurrences.

Draining off nervous impulses. But these continuously present stimuli which do not attract our attention are, nevertheless, constantly reaching and playing upon our senses, upon our sensory nerves, in a sort of subconscious way, and set up in us **subconscious reactions,** such as drumming with the fingers, playing with watch chain, stroking the beard, twisting the mustache, swinging the foot, and other nervous habits of a similar nature.

These are all subconscious, automatic, done without any attention paid to them whatever. These nervous habits arise as reactions from the constant stimuli noted above, and they drain off impulses and reactions that would divert attention from the main thing before us which we wish to study or accomplish.

Note this, then: When our attention is **wholly absorbed,** and we are really and vitally interested in any work or thought, then these nervous habits or motions cease for the time being. It is only in moments when we are slightly disturbed by something (such as these continuous stimuli above referred to) and our attention wavers and we are making an effort to keep it down to a subject or job, it is only in these moments of wavering, I say, that the twisting of the mustache, swinging of the foot, and so on, recommence.

The cure of diverted attention. The way to cure yourself of these nervous habits is to throw your whole mind stuff and soul stuff into **whatever you do, no matter how trifling,** and then, without any indecision or wavering, **go right on to the next piece of work** and throw yourself as fully into it as you did into the immediately preceding piece, and so on to the day's end. Devoted attention is the cure for many of these miserable little habits of divided or diverted attention.

What saves us all is that we can direct our atten-

tion **at will.** We can master it instead of being mastered by it, and so here again another channel for gaining control over ourselves opens up before us. Let us enter:

Exercise 1. Place your hand on a table, palm down. Put a large thick button or two silver quarters on top of each other on the back of the hand. Then put a five-pound weight on the button (or quarters); then ten pounds; and so on until pressure feels like pain. When you can't stand another pound, let some one divert your attention, and lo! the pain has vanished from the hand.

Any excess in intensity is pain: Excess of light is painful to the eyes, excess of sound to the ears, of pressure to touch, of strain to muscle. By diverting attention you reduce the excess. Many people can stand much more pain than others. Why? It is purely a mental matter; they can focus attention upon other things and thus divert it at will from the pain. We say they possess great self-control. It is simple, but it is great!

Exercise 2. Lift a moderate weight with one hand. Notice how heavy it feels. Now make a tight fist, as tight as you can, with the other hand. Do you notice how much lighter the weight then seems to be? Why is this? Because attention jumps away from the weight over to the new sensation of the fist, so that the weight is not noticed

so much as it would be were the diverting fist not there.

Do you want to forget some annoying memory or fear? Divert your attention to something else. The way to **forget** one thing is to **get** another **for** it.

The way to "let go" of one thing with your hands is to "take hold" of another; so it is exactly with our heads—and our hearts, too.

Perfect attention. We come back to the truth that the mind can attend fully and completely to only one thing at one time.

Law of sensation and attention. We want sensation to furnish the raw materials of thought, but after it has furnished them we want it to withdraw and allow the mind itself, undisturbed, to use and build the materials, that is, to think. If sensation still stays in the mental arena it will be in the way —it will disturb, divert, check, or stop the thinking process altogether. The law is this: The stronger sensation is, the weaker is attention, and *per contra,* the weaker sensation, the stronger grows attention.

Let us study this law a moment. Sensation may be made so intense (as a blow on or a pain in the head) as to paralyze consciousness altogether and throw the subject into a state of complete coma or unconsciousness. Intense sensations, not so intense as this but nevertheless intense (as a burn, a pain, a blow, a loud gong or roar of cannon, glare of steel

furnace or electric light), seem to so fill or monopolize consciousness as to prevent thought and cripple reflection as long as they continue, and for some time after.

On the other hand, intense thought makes us insensible to sensations, as when a scientist will work all day and all night at an experiment and never feel hunger or sleepiness, a business man at an enterprise and never notice the meal hour, a wounded soldier in action and not see the flow of blood or feel the pain of the bullet wound.

We can do our best and most rapid thinking and perceiving of truth when no sensation is disturbing us, that is, when all sensations are absent. Absolute attention is most readily obtained and held where there are no sounds, sights, or scents to intrude themselves upon our senses. So we say: **When sensation is at its minimum, attention is at its maximum.** They hold the relation of a seesaw to each other.

Application of the law. This is a very practical law to be applied not only to yourself in developing your own attention in your work, but also, so far as possible, in every interview you hold with a man whom you wish to persuade or move. Simply see to it that he is as free from sensation disturbances as you can possibly make him—have him seated with his face away from the street window so he does not see things passing in the street,

and away from an open door so he does not see things going on in the next room. Then his whole attention will be readily centered in what you are saying and doing. You have his perfect attention.

Concentration is prolonged attention. Attention may be attracted for a moment or two but not held. To study and to learn and to work require prolonged attention. The ability to concentrate is exceedingly practical. It is a time saver and a nerve saver—it enables us to read and to work rapidly and prevents that irritability we feel when we try to study and are not able to keep the mind down on what we are studying long enough to master it.

So the practical question is: How can the attention be **held?** And we answer at once: By the method of **change.** Let us experiment and prove this.

Attention Held by Changes

Exercise 1. Look at this **O.** Can you keep your mind on it without thinking of anything else whatever for more than a few moments? No, you cannot. But now look again, and as you gaze at it keep the mind occupied with changes as follows: Think of the size of the little circle, then of its shape, then of its color, then of its distance from the words around it, then imagine a picture appearing in it as in a frame, and so on—now, all this while your gaze and your attention are riveted

upon it, having been held to it by going **from one change of thought to another, but all about the O.** This is concentration. Concentration, as already defined, is **prolonged and sustained attention,** and the secret of it is to find out **some new phase of the same object.** This is what you want and must have as a master in any line.

Exercise 2. Sit alone and think of sheep jumping over a fence, one by one. How long can you keep this up without your mind wandering for a moment to some other image or thought? Try it for three minutes, and see how often your mind wanders, even if only for a second, from the sheep. Make a mark every time it does so wander. Notice, particularly, what kind of a mental effort you must make to keep the mind thinking about the sheep.

Keep the mind moving. The simple truth is that attention cannot be maintained for more than a few seconds on one single, simple thought, motion, or point. If you think to force attention upon such a single simple thought, motion, or point, the mind gets tired and goes to sleep—as all tired people do. This is a most undesirable condition in business.

We all need alertness. We must be wide awake. The opposite condition causes many errors of omission and commission, thus necessitating supervision and reducing value.

Monotony puts to sleep, or makes drowsy, just as the regular sound of rain on the roof, or gazing

at a dot without thinking about it. Monotony deadens.

But variety energizes. The object must change if our wide-awake attention is to be held, or else we must change our thoughts about the object if we are to hold our mind down to it. Let us take an example:

When we take a subject of thought or an object for examination, such as a house, we move our minds from one point to another of the house, that is, we think of the size of the house, shape, purpose, arrangement of the rooms, materials, colors, maker, cost, and so on, and thus we concentrate our attention upon this subject of thought and so learn all about it. This you may call focusing attention for a long time on **one thing** (the house), but that house is made up of so many smaller parts and smaller things that, after all, attention has moved from one to another of these smaller things, all of which belong to the house; and so we have directed or held our attention for an hour, two hours, or all day to one thing—a house.

Professor Brooks beautifully likens concentration of the mind's powers to the massing of troops for battle. A fortification is stormed and taken by the concentration of a battalion. Every hard problem or job is a fortification to be taken, and we must call in and unite all our mental forces to capture it —sensations, images, concepts, ideas, laws, and

principles—all must be marshaled. Attention enables us to collect them, and concentration to keep them pressing against the citadels of success, and carry them at last by storm.

Devoted Attention

We have considered "Divided Attention" and "Diverted Attention"; now let us consider "Devoted Attention."

Devoted attention is always the mark of a lover. Said a little child, "I am learning a page in German; it is n't very amusing, but it is for an agreeable surprise to mamma." How wonderfully love of somebody or something increases our mental powers!

It is difficult to focus our attention upon anything in which we feel only a small personal interest.

But love will correct this.

Love, after all, is the greatest thing on earth—love of knowledge, of fellow men, of firm, of employer, of employee, of our work—love of something or of somebody is the mainspring of progress.

Love is the essence of the desire to serve. Devoted attention is omnipotent. Devoted attention gives us a center around which everything else in our lives revolves in order and beauty.

"Attention," says Professor Brooks, "gives penetrating power to the mind. It is a kind of mental gimlet by which we bore our way into a hard prob-

lem or penetrate any subject difficult to investigate. It may also be compared to a sun glass. I place a sun glass between my hand and the sun, and gather the rays into a focus so that I could burn a hole through an inch board. So attention seems to collect the scattered rays of thought into a focus, enabling one to penetrate the hardest subject of investigation."

Genius defined in terms of attention. Indeed, so important is attention, that genius itself has been defined in terms of attention. Sir William Hamilton said, "Genius is a higher capacity of attention." Helvetius defined genius as "nothing but continued attention." Lord Chesterfield held that "the power of applying our attention, steady and undissipated, to a single object, is the sure mark of superior genius."

Brain building. Only about ten per cent of our brains are cultivated. This leaves a vast range of brain areas and delicate discriminations untouched, asleep, useless. Our senses are undeveloped or nonsymmetrically developed, insists Professor Gates.

That certain areas of the brain (cortical centers) govern certain movements of the body has been established beyond peradventure by the physiological psychologists of Europe and America. We know the brain centers of sight, hearing, smell, touch, motion, and so on. We know with remarkable accuracy what portions of the brain are used

by these different senses. The total brain is mapped out into sense areas as the United States is into states.

It has been established, too, that by exercising a certain part of the body, or one of the senses, we are actually building up brain matter. A man who cultivates his hearing builds up or creates more brain cells in the hearing part of his brain than the man who takes no training in auditory discriminations. If he cultivates sight, more brain cells have been built in that part of his brain, and so on with the other senses.

Moreover, development in any one sense not only makes more brain cells in that part of the brain, but also makes more mind generally, for that one portion correlates with and affects all the rest.

Professor Gates has demonstrated this brain building and mind culture not only in children and adults, but, to some extent, also in animals by multiplying their sensations and images experimentally. For one year, for several hours each day, he trained dogs to distinguish between colors. He did this by placing in the yard with the dogs several hundred tin pans, painted different colors, and by placing their food in pans of one color and by sending an electric shock to the dogs if they should touch any pan but the right one.

By methods such as this, endlessly varied, he taught them to avoid all pans but the right one,

which they would discriminate eventually from hundreds of others of nearly all shades, colors, and tints. They could at least distinguish between several shades of red and several of green, and in many ways exhibited more mentality than any untrained dog. Moreover, while one set of dogs was being thus developed, another set was deprived of sight and of sight exercise in a dark room.

At the end of the year, when both sets were killed and their brains examined, it was found that the untrained dogs had less than the normal number of cells in the seeing area, and the cells that were there were smaller, while the trained dogs had a far greater number of larger and better developed brain cells in their sight areas.

Hence you see that mental exercise creates brain structure and that effort to do a new thing causes the blood in the brain tissue to secrete stuff that will make the cell or cells needed to do the new thing; therefore, if we want more brain and better brain, we must train all the senses harmoniously and together.

Conclusion

Thinking employs all the materials and processes we have now gone over—sensations, images, concepts, ideas, judgments, and principles. Sensating gives us sensations; imaging gives us images; conceiving gives us concepts; ideating gives us ideas, and reasoning gives us judgments, laws, and prin-

ciples. The two activities of the mind always present in thinking are perception and consciousness.

Thinking shows that each thing depends on everything else. Every thought as well as every thing has had a cause in Nature. Nothing happens in matter or in Nature without law, without cause. Now let us realize, also, that nothing happens in mind without adequate cause. Every thought arises out of concepts, and concepts rise up out of sensations through images, and so the whole mental pyramid is solid, cemented, fitted together—grounded in sensations and ending in principles.

Mind is rooted in sensations, but it blooms in the heavens.

PART II: MEMORY

CHAPTER I

REMEMBERING

Memory Is a Vital Part of Ability

AS WE have seen in Part I, thinking is the foundation stone of Ability, for by thinking we lay in mental materials—five great classes of mental materials, namely, images, concepts, ideas, laws, and principles.

We "lay in" these mental materials. This implies that we must have some place in which we lay them. And so we have. It is a place where we put these materials "for keeps." Its name is **memory.**

It will be seen at once, however, that we must not only acquire or secure mental materials, and not only hold them, we must not only obtain and retain them, but we must also be able to summon them for use again and again, whenever wanted or needed. If we could not reach them after stowing them away, they would be utterly useless.

But even this **recall** would not be sufficient, for when we recall them we must have the power to perceive that they are the same that we put into the storehouse. If we could not tell this, we should be woefully deceived, and constantly misled.

Hence the power to retain, recall, and recognize mental contents makes us **able.** Have we such a power? Yes, and we call it memory.

Memory defined. Memory is the power to retain, recall, and recognize mental contents.

Some writers treat memory as limited to retention, but we agree with Professor Brooks and others that the term memory is properly used to embrace the entire faculty of retaining, recalling, and recognizing the images, concepts, ideas, laws, and principles acquired through the thinking process.

Consequently, memory is a great and vital part of our ability, for it runs throughout the entire mental pyramid, from base to top, and through the widest sweep of conscious activity.

Example of a good memory. Turning from this general consideration of memory as a vital part of ability, let us look at the question from the standpoint of the individual.

Perhaps you all know of some one who is the happy possessor of a good, strong memory.

I have in mind at this instant a man who is extraordinarily gifted in this direction. His power to retain, recall, and recognize things verges on the wonderful. His memory actually seems to be omnivorous and yet never full—there always seems to be room for plenty more. He hangs an event, date, or thought, a fact, name, or promise, on some appropriate peg in his memory, and there that thing

obediently hangs ever ready for its possessor whenever he desires to take it down and use it. The treacherous thing does not slip off the peg and mysteriously disappear, as is ordinarily the vexing case with the most of us less favored mortals. But there, like a burr, it kindly and obediently clings to the memory. He can rivet an entire speech or address and then repeat it practically word for word. A story once heard is but another increment to his mental treasures, and thus his resources and experience go on increasing at an amazing rate, and by the marvelous promptness, accuracy, and vigor of his memory he can draw drafts on all this intellectual wealth at will. This makes him an able thinker; it mightily increases his intellectual **ability.**

Some remarkable memories. Magliabeochi, the librarian of the Duke of Tuscany, could name all the authors that had written on any subject, giving title of the book, the words, and often the very page. To test his memory a gentleman of Florence lent him a manuscript to read, and, afterward, pretending to have lost it, requested him to endeavor to recall it, which he did with great exactness. One day when the Duke asked him to procure for him a certain book, he replied, "No, sir, I cannot; there is but one copy in the world, and that is in the Grand Seignior's library at Constantinople, and is the seventh book on the seventh shelf, on the right hand as you go in."

With a man standing by him ready to stab him with a dagger in case he missed one word, Justus Lipsius offered to recite Tacitus, word for word.

After sitting a whole day at a public sale, Hortensius, the next greatest orator to Cicero, correctly named, from memory, all the things sold, their price, and the names of the purchasers.

Seneca, the great philosopher, repeated two thousand names in the same order in which they were spoken.

Memory of names a great asset. Why, so apparently trifling a thing as the remembering of names is really an element of unusual ability and is so recognized, and almost worshipped in certain lines of public activity to-day. It is said that Themistocles could recall by their names the twenty thousand citizens of Athens. Cyrus is reputed to have known the name of every soldier in his army. Scipio knew the names of every Roman citizen. Cyneas learned in one day the names of all the members of the senate. Napoleon, Wesley, Washington, Henry Clay, Blaine, Grant, and others, possessed a wonderful ability in this line, and it was not the least element by any means in their greatness and popularity.

All of us like recognition, and are tickled to death with it when it comes from some great or celebrated and honored individual. But even in humbler walks we are all delighted to be called by name. It is pleasant, for instance, to go into a store or

into an industrial establishment and have the owner or clerk remember our names. We are attracted to that store which knows, remembers, and recognizes us.

Have you ever observed negro attendants at hotels taking the hats of a hundred or more guests as they enter the dining room, and returning them all, each to each, without an error? Does it not amaze you how they avoid getting hats mixed? Or have you ever watched railroad and other ticket agents instantly quoting rates down to the cent for hundreds of different points, connecting points and related lines, giving times of arrival and departure of trains, number of trains, and other particulars?

All this is **ability.** They can do **something.** It is the beauty and the power of their memory.

Memory Is a Vital Part of Knowing

Do you think you "know" how a cannibal or an Indian thinks and feels? or a murderer? or a thief? or a very old person?

"No," you reply, "I do not."

"Why?"

"Because," you answer, "I have no experience along those lines."

True, but this is but another way of saying tnat you have no cannibal-memories, no Indian-memories, no murder-memories, no thief-memories, no old-age-memories. Your mind has had to deal with entirely different images, concepts, and ideas, and

therefore you have no memories within yourself with which to compare or classify a cannibal's thoughts or emotions or passions.

There is a great contrast between your feelings and thoughts and theirs. But we do not "know" by contrast; we only know if our feelings and thoughts are similar to theirs; then we "sympathize," then we cognize, then we recognize, then we "know."

If a new image or idea strikes you and you have nothing in the contents of your mind at all like it, you must mark it "first of a new class," and wait for other similar images or ideas to come to you before you can say "I know." Memory is a vital part of knowing.

Take another illustration. What is the basis of true character reading? The knowing of oneself, retained by memory. The external signs by which we read the motives and feelings in the minds and hearts of our neighbors are poise or attitude of body, facial expression, gestures, and tones of voice. We recall how we felt when we made the same gestures, had the same facial expression, assumed the same poise, and used the same tone of voice. When we have observed these signs in many people we can group or classify them and thus get a rule or rules on each point, in other words arrive at a science of character reading, and our personal use of this science will be safe, sound, and true accord-

ing as we remember these points at the time our subject or neighbor is before us.

Memory is a vital and indispensable part of knowing, which, as we have seen, consists of thinking, remembering and imagining.

Fuller calls memory "the treasure house of the mind." Sir H. Holland says it is "the foundation of intellectual life." By memory we form concepts, for if we could not recall an image after we had once secured it through sensation, we could never get a class of images, and so could never form a concept, which is a class of images, and thus we would never develop language, for language uses concepts.

Memory is, therefore, one of the all-important mental functions or processes. All knowledge is dependent upon the memory faculty.

Again, memory is the basis of reasoning. Unless we could retain, recall, and recognize our images and concepts we could not compare them or unite them, and so could not form judgments, laws, or principles.

Finally, memory is the basis of personality itself, the core of the ego, the means of self-preservation as a conscious identity. Serious disturbances in memory always and at once produce serious modifications in human personality. If you could not remember your past you would be a different person entirely. Striking and marvelous have been the

cases, both spontaneous and experimental, which science has gathered and studied in recent years. This is a great field and we can merely refer to it in passing, simply to impress you with the profound importance, the deep, central significance of the faculty we are now studying—**your memory.**

CHAPTER II

RETENTION

RETENTION is the first of the three functions of memory. You cannot retain until you have first obtained. You cannot remember unless you have clearly sensated or learned. This is the receiving and recording referred to in Lesson Four.

By memory we retain sensations, images, concepts, ideas, laws, and principles. By memory we recall what we want. By memory we recognize what is recalled as just what is wanted.

We naturally think of this retentive faculty as a storehouse, a treasury, where we keep our valuables under lock and key, or disk on which, like the phonographic record, the characters are engraved to be recalled and known again at will.

How knowledge is thus retained cannot be explained. It is one of the mysteries of the mind.

When we commit to memory we entrust our images and thoughts to something that can care for, keep, and guard them all. " 'Tis memory alone that enriches the mind by preserving what our labor and industry daily collect," writes Dr. I. Watts.

Memory undying. Now let us speculate a little. It is my theory that memory is undying, that it

lasts as long as personality itself lasts, that retention is absolute; that the power to retain impressions is a deathless power, that any and all impressions when once made upon the tablets of a man's immortal memory remain there unchangeably forever, or as long as consciousness or subconsciousness itself remains; that there really is no Lethe, no Nepenthe, no absolute forgetfulness.

A thorough study of memory leads into the deep regions and recesses of consciousness. A thing, a thought, an event is a **member** of the mind when it is before us. Then it sinks down into the perfect storehouse or retention room. When we recall it we make it once more a member of the mind, that is, we **re-member** it.

If images and thoughts were always in the field of consciousness they would not need to be recalled; but as they continually pass from the field of consciousness, they must be brought back again, and when so recalled we say they are remembered.

Knowledge not retained in consciousness. Knowledge passes from the field of consciousness to the field of subconsciousness. If the mind were always aware of all past experience it would be overpowered—swamped. Fortunately, memory tends to become organic and "knowledge," as Burke says, "sleeps in the tomb of the subconscious."

That memory is undying is, of course, speculative. It cannot be demonstrated mathematically. Like

infinity or eternity, it cannot be proved, but must always remain an inference, a belief, grounded on not a few strong and stirring facts.

Retention and recall. Since memory is the faculty by which all mental impressions are retained, it may hold them so well under mental lock and key that we cannot induce it to unlock and give them up on demand. We may have many things stored in memory but cannot at will bring them into the field of consciousness, though they may and often do come there unbidden. A retentive memory is a good thing only when it is not so deeply retentive as to become a prison house instead of a storehouse.

The practical question for each of us is: How can I recall from this capacious and everlasting storehouse the images, concepts, or ideas that I need now?

CHAPTER III

RECALL: DEGREES AND KINDS

RECALL is the second function of memory. To remember is to make a formerly acquired image or idea a member of the mind once again, or oftener. Under anesthetics we remember nothing and we forget nothing, for anesthetics so affect the nerves that sensations are not recorded upon the brain and hence there is nothing to remember when the patient comes out, neither does he forget anything, because there is nothing to forget.

Re-imaging is remembering an image. For example, I recall a green tree in my front yard, that is, I re-image that tree, that particular tree and no other tree. By the law of association it may remind me of another tree or of many others, and then I am led on to reconceive the concept "trees." I recall the word "tree," and I remember that that word names a concept.

Remembering — Recollection — Reminiscence; Crabb, Hegel, Harris, and others draw subtle, various, and mutually disagreeing distinctions between these words. We say simply that memory is the

power to retain, recall, and recognize mental contents, and that this second function (recall) includes remembrance, recollection, and reminiscence, for there is one thing common and central to the meaning of all these words and that is that something before known or experienced is mentally reproduced or re-presented.

Our own experience tells us that the operation of fixing a thing in mind and the recalling of that thing are quite different processes. In committing to memory we seem to be working from the outside inward, and in recalling we work from the inside outward.

Voluntary and involuntary recall. As we sit in reverie, reading nothing, thinking of nothing in particular, ideas and images seem to chase each other or float through the mind, appearing and disappearing. This is involuntary recollection. When we direct this process by an effort of the will we are exercising voluntary recollection.

Some are quick in thus voluntarily recalling the facts, names, dates, and other things they wish; they seem to have everything "on the end of the tongue." Others are slow or imperfect in recalling, often passing through a painful mental effort before the item wanted is caught and fished up; they have a word, for instance, "on the end of the tongue," but there the pesky thing hangs! They can't get

it any farther along! They can't get it **off** the tongue! There it sticks and **won't come off,** to the chagrin and embarrassment of the poor victim.

Testing and Training Memory Power

Galton formed a table or nine-foot yardstick by which to measure or rate one's power of recall. Think of some simple and common object, such as a kitchen table, try to remember or recall every point in its construction, appearance, and contents, and then see which of the following descriptions will most nearly describe your success or failure:

1. Highest and best: My recall is brilliant, distinct, detailed, complete.

2. The mental image is perfectly clear and bright, inside and outside of drawers.

3. I can see the table or any equally familiar thing with my mind's eye quite as well in all particulars as I can do if the reality is before me.

4. Fairly clear, in general, well defined, but attention has to be directed to different parts to call up the table as a whole.

5. Fairly clear, definition or distinctness varies considerably, one or two objects or parts of the table being much more distinct than others, but the latter come out clearly if attention is paid to them.

6. Dim, certainly not to be compared with the actual scene. I have to think separately of the several things on the table to bring them clearly before

the mind's eye, and when I think of some things the others fade in confusion.

7. Dim, and not comparable in clearness to the real table; very incomplete; very little of one object is seen at one time.

8. I am very rarely able to recall any object whatever with any sort of distinctness. Very occasionally an object or image will recall itself, but even then it is more like a general image than an individual one. I seem to be almost destitute of visualizing power.

9. My powers are zero. To my consciousness there is almost no association of memory with things. I recollect the table, the fact of its existence, but do not see it in my mind's eye.

Read all nine descriptions and mark the one where you think you belong, the one which rates most closely, in your judgment, your ability in re-imaging.

The Five Enemies of Recall

1. Time. The longer the time between event and recall, the dimmer the memory grows, the more difficult it is to recall it—other things being equal.
2. Disuse. The less the number of recalls or repetitions the feebler the remembrance becomes. This is a natural consequence or corollary of the time element.
3. Indifference at moment of first impression.

The less the interest when the first impression is made, the dimmer is the recalled image or remembrance.

4. Mental or physical exhaustion. Recall is crippled when the brain or body is tired out. An appeal to your own experience will settle this.
5. Divided attention. The more attention is divided or diverted the feebler will the recall be.

These are the enemies. Can we conquer them? Yes. Your studies in this textbook and other parts of this course will teach you how to put them all to flight.

1. **Time.** Here are some interesting experiments, tests, and exercises to show how recall becomes more and more uncertain and imperfect with the lapse of time.

Exercise (an experiment in sight-memory). Get eleven sheets of blank paper or eleven white cards. Number them from 0 to 10. Put two dots on No. 0 a half inch apart. Put one dot on each of the other papers or cards. Now run the eyes once over the distance from one dot to the other on paper No. 0. Allow five seconds by the watch to elapse and then put a dot on paper No. 1 as far from the dot already on it as you think the two on No. 0 are apart. Rest. Glance at No. 0 again, and after five seconds put a dot on No. 2. Go through the ten papers in this

manner and you will have a series of distances reproduced by eye-memory at intervals of five seconds. You can add up the results after accurately measuring the distances between the dots on each paper, divide by ten, and you will find your average error of memory for the time of five seconds.

A set of such experiments conducted by Professor Scripture at Yale gave the following results, which I give here as a sample of what each student may do for himself. The dots on No. 0 were fifty millimeters apart, and the distances struck on the other papers were as follows:

1st exp.	55.1
2nd exp.	57.9
3rd exp.	60.0
4th exp.	55.1
5th exp.	55.6
6th exp.	57.9
7th exp.	56.7
8th exp.	57.1
9th exp.	56.2
10th exp.	57.5
Average recall	56.9
Original dist.	50.0
Constant error	6.9

From the results of many actual experiments in this line we can deduce the fundamental law of memory as far as time-element is concerned, and we

state it as follows: The average change in the memory-image or idea is an individual matter depending on circumstances, but the average uncertainty **increases in a definite relation to the time.**

How to overcome this time-enemy will be shown when we come to the Law of Association and the Rule of Repetition.

2. **Disuse.** This enemy can be fought and conquered only by repetition, by use, that is, by frequently recalling or going over or rehearsing the thing you desire to keep fresh and green in your memory. There is no scheme, trick, or device on earth that will endow any one with some magical power whereby he can avoid the necessity of repetition, of rehearsal, of practice, of work, especially in certain definite cases and circumstances, as stated in Chapter VII.

3. **Indifference at moment of first impression.** "There are many who complain that they can scarcely remember anything they hear. Have done with your lying! I'll be bound to say you remember what you sold your old white horse for at the fair three years ago. Certainly, that has not escaped your memory." Thus wrote an old-fashioned Welsh preacher. The good dominie knew well enough what we all know well enough, that we remember **what we are really interested in.**

"Creditors have better memories than debtors," said our American Solomon, Benjamin Franklin.

A woman went to hear a sermon. The preacher exposed all evil practices about dishonest weights and measures. Meeting the woman next day he asked whether she had remembered the sermon. She at once began to complain of her poor memory, and said she had forgotten almost all he had said. "But one thing," said she, "I remembered. I remembered to burn my bushel."

Can any one guess why she happened to recall that particular part of the sermon!

Thomas Fuller is said to have had a remarkable memory. When, in the company of some public officers, they praised him for it, he said it was true that fame had credited him with a fine memory, and that he would now give them an example of it. The officers were delighted with his proposition, and told him to proceed with his experiment. "Gentlemen," said Fuller, "you have thought fit to sequester a poor but honest neighbor of mine and have sent him to jail. He has a large family of children, his circumstances are indifferent; now, if you will please to release him out of prison and restore him to his living, I will never forget the kindness as long as I live." This was received with applause and the debt-imprisoned man was set free. The Council never forgot the incident.

We remember ideas which are like our own, which fit our own. Ideas like our own we like because they are alike. We are always interested

in our own things, and ideas belong among our own things. We love to see our own coming to us. When a man utters an idea and we see it is like an idea we already had and recognized as our own, we are glad to welcome the confirmation from another source. So we pay attention, keen, interested, vital attention, to what he says, and consequently never forget it.

The details of our business or trade or profession are remembered and readily recalled because they interest us, and because our living and happiness and that of those dependent on us hang on it, and so we give interested attention.

We remember vividly striking, sudden, or unexpected experiences or feelings; they attract our attention; they command it; they demand it; our interest is awakened at once; and so we easily recall the striking event or thought.

A man in peril will recall the most trifling incident that occurred, because peril immensely intensifies interest and makes the first associative tracts in consciousness very vivid. For example, if you have had a dear friend, one very near and dear to you, who was drowned on a pleasure excursion, you cannot ever think of boating parties without thinking also of the likelihood of drowning—a deep tract or line in consciousness was formed by the first impression because of your profound interest in that incident. Had your friend not been in the accident, it would have yielded no influence over you.

Interest is the secret of the early memories of childhood which recur in old age and surprise us all, for it seems so strange that any one should forget the vastly more important things of middle life and remember the seemingly insignificant items of childish years. But were they really insignificant **at the time** of their occurrence? The fact is that most of those early impressions of which we hear so much were made at a time when trivial things could seize and monopolize our entire consciousness, filling and flushing and flooding the fountains of feelings so that forgetting was rendered absolutely impossible.

A vivid impression remains in mind like the nail in Sisera's brain.

What to do to kill this third enemy. Two things. First, awaken a lively interest in anything you **wish** to remember, or **need** to remember, or **decide** to remember. "Love is the parent of memory." You cannot concentrate properly and fully on any thing or work which you do not love, or in which you take no interest. Second, imagine every duty you have to do is **the most important** thing on earth for you **at that particular moment.** Then you will bear down hard on the pencil point of concentration, as Mr. Sheldon phrases it, your powers will be on that duty, you will be "all in" on it. Love is the basis.

4. **Mental and physical exhaustion.** Brain cells cannot work unless they are kept in good condition.

The cells are fed from the blood; blood is modified by food and drink; it is purified by fresh air. Waste matter, dead stuff, must be eliminated by exercise and other processes. Now then, by these two processes (supply and elimination) endurance is maintained. But if the blood is deficient (in phosphates, for example) or impure (loaded with waste matter or ptomaines), the cells cannot do their work and the memory is slow, sluggish, and unreliable. Any slight derangement of the bodily functions, or even the condition of the atmosphere, or overwork, or overexercise, will unfavorably affect the memory. *Mens sana in corpore sano.* When weak, tired, sick, it is hard to remember, to recall, to recollect, for example, a word that we need. Similarly in the feebleness of old age.

So, we say simply: Cultivate health, and it will react favorably upon all the mental functions.

5. **Divided attention.** Attention is fundamental of course to all mental processes. There is no use in trying to accomplish anything in conscious activity without attention.

One of the old methods of focusing attention and of cultivating the memory is "visualizing." (It is really reconstructive imagination. See Part III of this textbook. Its reputed discoverer is Simonides, who lived four hundred years before Christ. It was taught also by Pythagoras and by Mimas. It is simply to put into pictures what you read or what

you hear, and then you will remember it. For example, when you say "night," think of darkness, stars, chill, and so on, or "green trees," call to mind their limbs, branches, and other parts.

Now this is simply nothing more nor less than attention focused on the thought or meaning of words, and this focusing renders the impression more vivid and distinct.

Visualizing is a good thing for the "eye-minded," but it cannot help the ear-minded or touch-minded. The blind cannot remember by visualizing, yet as a rule they have remarkable memories.

Visualizing as taught to-day by some teachers of memory-culture is simply a form of association, namely, the associating of a name with the appearance of the person who bears it, or the associating of city name or town name with a certain landscape, or of mental pictures of waves, winds, and foam with the word "sea" or "ocean," and so on; in short, visualizing is re-imaging visual images, and the more images we crowd into one word the more numerous are the relations or associations established and hence the more vivid will we make that word.

This is a good thing to do, and it will greatly help you to practice it.

But visualizing will not answer as a universal and all-comprehensive rule for memory work. It will not answer for auditory images, or tactual

images, or olfactory images, or gustatory images. You cannot visualize a sound, a smell, a touch, or a taste. But you **can** focus your attention upon them and associate them with various other things so as to recall them easily and readily.

Auto-suggestion. Auto-suggestion is a help to secure attention and deepen the first impression. Say to yourself, "I will remember this." Emphasize the word "will." "I **will** remember this, and that's all there is about it." Say this earnestly, with quiet force and emphasis. **Learn to command yourself.** "Make me mind me," as a little girl said. Trust yourself.

And yet, true though all this is, we must be true to some other phases of the whole truth, and so must plainly remind you that it will not do simply to say to yourself, "I will remember this." How often you have said that and how often your memory thus dealt with has played you false when you wanted it most. You have often said on hearing a good joke, "I'll remember that." But you did n't. You could not for the life of you recall the joke when you needed it most. Or, when you heard a name, you said, "I'll remember that." But you did n't.

Association. Well, what's the trouble? Why, something more is needed, and that is **association.** But with association, auto-suggestion is a fine thing, a good thing, a necessary thing. Alone, it is weak,

formal association alone is also weak; but both together plus attention constitute a mighty **memory trinity.**

This point is important. It must be emphasized further, for I don't believe in any clap-trap, magical methods of memory. So I repeat that attention and auto-suggestion (powerful as they are and helpful) are nevertheless "up in the air" unless resting on the solid bedrock of mental coupling—the association of ideas. We must relate one image or idea with another or with a group of others, and then, if by attention and auto-suggestion we deepen and enforce that association we'll **have** that image and idea, to "have and to hold" practically forever. Hence we must study association as really fundamental in recall.

Thorough understanding as an aid to memory. Some say that when you thoroughly understand a subject you will remember it. This simply means focused attention and interest and the forming of associations, for if you have interest in anything and focus attention upon it you will soon understand it, that is, you will **relate it to other similar things or contrasting things**—you will form mental associations. This is what you mean when you say, "I understand that thing." And when you once thus thoroughly understand it, it becomes, by reason of these established relations of similarity or contrast, a permanent piece of the furniture of your mind,

fortified and buttressed by the things it is associated with. "United we stand, divided we fall," well may the contents of the mind exclaim.

You can never hang a man until you have caught him, so you can never remember a thing (law, method, process, problem, event) until you study and relate it, until you understand it. You must catch it and entangle it, as it were, and **mix it up** with other things in your head, so that it can't drop out or sneak out without drawing a whole lot of other mental things out with it, which commotion will arouse you and warn you, and you will recall it, you will call it back, catch it and—**keep it.**

Concentration is necessary to get a clear grasp of any subject, necessary to "understand" it. But when you once clearly understand anything you will readily recall it, for one point will suggest another until the whole will be remembered.

Therefore, cultivate attention. Be alert; aware; for then the flash of this awareness, this alert state of mind, will photograph the item on the plates of memory, so that you can make as many copies from that negative as you wish.

Exercise. While reading or listening to a discourse keep your mind from wandering and assist attention to focus by articulating to yourself—not aloud—but by silent whispering, that is, by the mere motion of the organs of speech, thus repeating

the words as you hear or read them. This helps to rivet them in memory.

Any object once fully and carefully attended to, tends to remain in memory, for it establishes its own relations; therefore, you can, in joy and confidence, afford to let it attend to itself.

Thus will all enemies be defeated, and memory can be turned over to its friends.

CHAPTER IV

RECALL: THE FRIENDS OF MEMORY

CAN you remember best what you read, what you write, or what you hear? You ought to understand yourself on this important point. "Know thyself" will here prove a time saver, a patience saver, and in that sense a life saver. Hence we offer the following test:

Exercise. Silently read one stanza of some new or unfamiliar poem; read over the stanza but once, focusing your attention upon it as you read it; then close the book, and see how much of it you can repeat correctly from this one reading. Having done this, ask a friend to read to you the second stanza, once, and see how much of that you can repeat correctly. Then write out the third stanza and repeat as much of it as you can. Then take the fourth stanza, read it silently to yourself, then write it out, and now see how you succeed in repeating it aloud. You will be greatly interested and benefited if you will conscientiously **do this.** Finally, go over the fourth stanza once more, this time noting the **contrasts** and **similarities** in words, thoughts, and sounds, and by these contrasts and **similarities** recall the whole stanza.

I have just again made an experiment like this with myself. I selected a poem with which I was not familiar, four lines to each stanza. The first stanza I read silently with fixed attention and found I could repeat one line correctly; the second was read to me, and of it I could scarcely recall anything except a word here and there; the third I wrote, and recalled two lines correctly; the fourth I read silently and then wrote, and found that I could recall everything except three words which I got incorrectly. Lastly, I went over the fourth stanza once more, mentally noting the contrasts and similarities (such as "body" vs. "soul," "torchlight" and "fire"), and then I repeated the stanza with absolute accuracy.

From this experiment and many more like it you see it is practically useless for me to have anything read to me which I wish literally and accurately to remember; I must read it myself. But the quickest method for me is to write it out myself and note contrasts and similarities in word or thought as I go along. In this way, at one sitting, I can commit rapidly and with reliable accuracy. In other words, sight is my strongest mnemonic sense. I am an eye-minded man. An eye-minded person will remember an event in terms of sight; he recognizes persons, things, and places by their looks. Let each student test himself thoroughly on this point.

Hearing. An ear-minded man has his conscious-

ness crowded with auditory impressions. He recognizes persons and places and remembers events in terms of sound. In describing the same event described by an eye-minded man he would use different language and draw entirely different mental pictures. He would remember a poem better by hearing it read or by reading it "out loud" himself.

Can we remember better what we hear than what we smell? Suppose your eyes were tied shut and a rooster crowed near you and then the living fowl was brought close to your nose—which memory would be the most vivid? Or, by which sign could you most readily and clearly identify the object before your senses? Any one will say, "By the crow; for a rooster smells like many other birds."

Hearing as a mnemonic aid stands next to sight and above smell.

Smell. Is a smell-memory more powerful than a sight, hearing, or touch memory? Is the fragrance of a rose more difficult to recall than the size, color, and the feel of it when you handle it?

It is hard to recall the scent of a rose. Professor Titchenor thinks that it is actually a lost art, which might be regained. We can easily recall the shape and size (sight) of the rose, and it is not so hard to remember the feel of its leaves and thorns, but it is difficult to recall the scent, the smell-image—difficult to reproduce the life-likeness of the fragrance-sensation.

Sight, hearing, and touch are much superior to smell in ease of application and scope of territory as mnemonics.

Yet by the law of association, through the form of contiguity (see following chapters), smell has in thousands of cases been a mighty friend of memory —the fragrance of a certain flower recalling a scene or event supposed to have been entirely forgotten. (For further discussion, see Chapter VI.)

Touch. As we have seen, some people are eye-minded, some ear-minded, and now we remark that others remember in terms of touch—strains, pressures, weights, movements, attitudes, roughness, smoothness, and so on. This is the motor-type of mind. The touch-minded have to weigh things, feel them, handle them, in order to remember them as they would like.

Mankind, however, receives many more ideas, much more thought, through sight and hearing than through touch.

Taste. Which is most definitely and easily recalled, the feel of an orange when you handle it, or its taste when you eat it? Let each one examine himself on this point.

Organic memories (hunger, thirst, pain, nausea, etc.). These are vivid, so much so, in fact, that many people cannot recall them without actually reproducing the original bodily experience. I can recall jelly cake! I can recall it easily, very easily, but

I don't like to do it! The fact is, it makes me almost as sick merely to think of it as it did when, as a boy, I ate too much of it!

All things considered, sight is the best mnemonic sense.

Exercise. Get ten small squares of paper of different colors. Get, also, ten white cards and write the ten numbers on them, I mean from 0 to 9. Have a friend arrange the ten colors in any order he chooses; come up to the table when he says he is ready, look at them a moment, and then go away and write down the order of the ten, as well as you can remember that order. Then try with the numbers the same way. Repeat this, with a different order each time, for thirty times each. Have the friend note all errors you make in recalling the order at each trial, and sum up for the entire series of sixty trials, thirty with colors and thirty with numbers. This we will call the series of **visual** recalls.

Now have him arrange the ten colors in any order he chooses; you sit back so you cannot see them, and have him read aloud the order he has chosen. From hearing it read once, write down on a pad the order as you can recall it. Try this with the ten numbers. Make thirty trials with colors, and thirty with numbers, and have the friend mark and sum up the errors. This is the series of **auditory** recalls.

In the experiments that have been made along

this line and recorded, notably by Professor Scripture, we find that for visual memory the errors are eighteen per cent, while for auditory memory the errors amount to thirty-four per cent.

In this way, among others, we prove that we can remember better **what we see than what we hear.** This is a pointer in committing things to memory. Sight makes a deeper impression on the tablets of the mind than hearing. (From this standpoint what an incalculable advance has been given to the world by the invention of printing!)

Training observation and memory. Detectives are trained in observation and memory. They are taken into a room, walked around it once, and then required to write down all they saw and can recall. On the first trial the list contains eight or ten articles fairly well described; but, when trained, by repeated trial, they can enumerate sixty to eighty items which they saw in that brief time and remembered.

This faculty of observation and memory can be wonderfully cultivated by effort and practice. Take the case of the French magician Robert Houdin. Walking down the street with his son they both cast a sharp and attentive glance at a store window as they passed, and then, a few steps farther on, stopped and each wrote down all the articles he could recall. This training was kept up until an astonishing **ability** was developed. The son could

remember as many as forty objects caught at a glance, caught "on the fly."

In a private exhibition this boy gave the names of more than a dozen books in another room with their positions on the book shelves—all of which he had observed at a single glance as he passed rapidly through the library. Those who witnessed this performance could not explain the source of his knowledge. They thought it was some kind of second sight or magic affair.

And so it was; but the simple magic of practice—practice in attention and memory.

How General Grant remembered names and faces. General Grant was one of those "gifted" mortals who could recall names of persons with amazing accuracy. His method was: (1) To note some peculiarity of each person as he was introduced; (2) to repeat the name of the person to himself while he mentally pictured or recalled that person's appearance. Now when we come to analyze this method of Grant's we find in it four things: (1) Effort to make the first impression vivid; (2) visualizing; (3) repetition; (4) association—as association of name with person, of peculiarity with person, and of all three in one. Grant was a type of the eye-minded man.

Hearing can be similarly trained and used (and is so used by the ear-minded) so as to aid in recalling persons and animals and birds by the quality of voice, of footstep, or other sounds they make.

In short, all the senses, by the law of association, can be made to serve memory and to stand by her as her strong, ever-ready, and dutiful friends.

Exercise. If you wish to find out whether you are predominantly an eye-minded, ear-minded, or touch-minded person, simply think of some friend, and as you recall that friend watch yourself to see whether you primarily and instinctively recall first his features, outline of his figure, colors of his clothes, in familiar surroundings; or do you first and foremost think of his voice, its intonation and inflections, his pronunciations, shades of emotion manifested thereby; or, last, do you think of the clasp of his hand in a handshake, whether it is strong or weak, the feel of the skin, clammy or dry and cold, dry and warm, moist and warm, feel of hand as a whole, soft, pliant, hard, thin, bony, tender, plump?

Of course you can think of all these factors when you recall a friend, but what I want you to do is to use this threefold psychological yardstick when you just **happen** to think of any friend during the day, that is, when you find yourself remembering some one, apply this threefold rule and see whether the terms in which you **first** and **most naturally** recall him are the terms of an eye-minded, ear-minded, or touch-minded person.

CHAPTER V

RECALL: THE LAW OF ASSOCIATION

OBJECTS once associated together tend to remain associated in the mind, so that when any one of the group or series is thought of, the others are likely to be thought of also, and in the order in which they originally followed one another in time or the order in which they existed side by side in space.

What is it in the thing we see for the first time that makes us think of some old object seen before? We answer, some one of the five forms of association, namely, Cause and effect, Whole and part (contents), Contrast, Correspondence (similarity), or Contiguity. Hence it is the law of association, after all, that does the work. Consequently, the tried, tested, and trusty term "association" is correct and sound. We can say, of course, and truly too, that one idea "suggests" another; but we now know that it does so because some form of association lurks between the two.

The law of association is so important that it has been compared in the sphere of mind to what the law of gravitation is in the physical universe—**the force by which all things are held together in**

relations or associations. Wundt, the great German psychologist, goes so far as to assert that without association there can be no consciousness at all.

The law stated. The law of association is this: All connections once set up between any of the mental contents tend to persist and to reproduce themselves. Stated more briefly: **All mental relations once established tend to persist.**

That this is a fact can easily be proved, for it is the universal experience of mankind. When one thing is thought of, another thing immediately follows it into the mind. Note what you are thinking of now, and ask yourself how that thought entered your mind. You will see that **something** (a preceding thought or sensation) suggested it. It had its antecedent link. No thought stands alone. It always has its relations, the same as we do. No man was born isolated; he was born **into** relations, **from** relations, and **by** relations. Exactly similar is it with thought or ideas.

Stated in terms of physiological psychology, we would say that recall is the power to refunction possessed by any group of brain cells. When a key is struck on the piano a tone is registered upon a group of cells in the auditory center of the brain, and whenever thereafter that group of cells functions (stirs, acts) we remember that tone. That group can be caused to stir or act either by striking the same key again (that is, by an external stim-

ulus), or by an act of the will (that is, by an internal stimulus). This is called cell-memory. The subject of cell-memory is a great subject indeed, and its discussion leads from so small a thing as the atom or ion up to so great a thing as cosmic consciousness. It shows that there really is no such thing as absolute forgetting; that all things—words, acts, thoughts, events—are registered permanently somewhere in the universe, of which you and I are parts.

The law of association is a natural law. We use it, therefore, in our system of memory culture simply because it is a natural law. We do not take much stock in artificial systems of mnemonics, however specious or ingenious they may be.

The forms of association. Here we recall the fundamental distinction drawn in Lesson Four, namely, that of **likeness** and **unlikeness.** We find that things and thoughts are either like one another or unlike, and it is this similarity or dissimilarity that strikes the mind and **holds them together.**

There are, as we have said, five natural forms of association, or five natural ways in which the mind associates its thoughts together: (1) Cause and effect; (2) whole and part (contents); (3) contrast; (4) correspondence (similarity); (5) contiguity.

Three of these forms are based upon dissimilarity, and two upon similarity. The three based upon dissimilarity are causation, contents, and contrast. An effect is quite dissimilar from its cause: for

example, lightning and thunder, key of piano struck and the tone produced, and so on. So, too, the whole is dissimilar from any of its parts, as for example, spoke and wheel, citizen and city. We shall now take up these five forms separately and see definitely what is meant by each.

The Five Mental Dumb-bells

1. **Cause and effect.** This is a natural form of association simply because when a cause is mentioned or thought of it is inevitably followed by the thought of its effect; or, if effect is first mentioned, the mind at once seeks out the cause and thinks back to it.

When we think of a hammer falling we at once think of the sound or noise produced; gunpowder brings into mind explosion; explosion brings the thought of death, mine accidents, etc.; "knife" reminds us of wound; "slavery" of the Civil War; "tea and tax" of the Revolution; "locomotive" of a train of cars; "jelly cake" of nausea; corruption of morals and dissension of rulers of the fall of the Roman Empire; Peter the Hermit makes us think of the Crusades; luxury and immorality of the French Revolution; cube root recalls the process by which we extract it. (All mathematical processes bring to mind the law or rule by which they are unfolded or of problems solved. They are **essential, logical** relations.)

Here are some illustrative examples of **trains of thought** based upon the form of association known as Cause and Effect:

1. Thunder, lightning, shock, fear, feather bed.
2. Fulton, steamboat, excursion, Sunday school, church.
3. England, taxes, Revolution, Bunker Hill, trip to Boston.

2. **Contents,** or the relation of whole to parts, or of part to whole. "Cog" or "spoke" naturally makes us think of the whole thing (wheel) of which it is a part; "house" reminds us of "town"; "cannon" recalls "war"; shriek of an engine whistle makes us think of the entire train.

You remember that an image is composed of a number of sensations. Now, since some one of these sensations may be more constant, or interesting, or important, we often and often recall the whole thing from just this one part of it. For example, I hear a sound and say, "It is a street car." But the sound is not the street car; in fact, it is one of the street car's least important parts or manifestations. The real street car is a feelable, visible thing which this sound calls up in my mind.

It might have called up the image of a wagon or of a railroad train. Why did it not? But it did call up the image of a wagon in my brother's mind, while in mine it recalled one of a street car. Let us look at this question a moment. Let the

egg-shaped figures **A** and **B** (Fig. 18) represent two groups of cells in our brains or two images in our minds, and let the small portion where they overlap (marked **S**) represent one sensation common to both groups, as sound is common to street car and water wagon, and a lot of other things. When **I hear** that sound, some single point of association leading from **S** toward **B** will set off that group of cells and I say, "I hear a street car"; my friend hears the same sound, **S** but some memory-tract

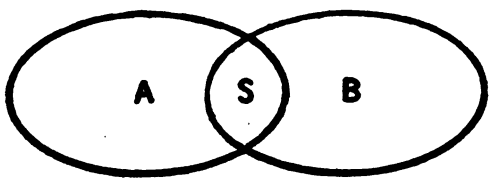


FIG. 18

leads off toward **A**, and he says, "No, it is a water wagon." The same sound will thus stir different memories, simply because it is a **part** of each.

Utter the sound "hat." What comes up in your mind? In mine, an old gray slouch; in yours, probably, quite another image; in your wife's quite a different one from both of ours. To the Hottentot or Hindu that sound would have meant nothing.

Professor James (to whom I am indebted for the egg illustration) has a beautiful passage con-

cerning the contents form of association. He says: "Objects at first appearing as wholes are analyzed into parts, and objects appearing separately are brought together and appear as new compound wholes to the mind. Analysis and synthesis are thus incessantly alternating mental activities, one preparing the way for the other, much as, in walking, a man's two legs are alternately brought into use, both being indispensable for any orderly advance."

This passage beautifully sets forth the **naturalness** of this mode of mental association. It is not forced, or artificial, but organic and essential; in a word, natural.

Think of a monument in Rome and you recall the square where it stands; that makes you think of the city of Rome as a whole; that recalls Italy; that a trip abroad, and so the mind runs on and on until stopped by some new sensation or by an act of the will. Nothing stands alone. It stands in a group or class, as the individual stands in the species, and the species in the genus; name the group, and the particular thing will come to mind, or name the particular thing and the group will mentally appear. Here follow some examples of trains of thought based upon the form of association known as Contents.

1. Illinois, Area, the Sheldon School, the main office, a board meeting.

2. Science, psychology, mind, memory, Ability.
3. Nail, hardware, steel, railroads, business.
4. Animal, horse, gray, old Bill, the farm.

3. **Contrast.** Joy naturally suggests sorrow; sickness makes us think of health; giant of dwarf; white of black, thin of fat, ugly of beautiful, high of low, hot of cold, near of far, rich of poor, good of bad, big of little, individualism of collectivism, faith of doubt, and so on. This is so common, clear, and simple that we need say no more concerning it.

4. **Correspondence, or similarity.** The correspondence may be in small matters, such as the letters of the words, the initial letters, for instance, which gives us alliteration, such as, "Many Men of Many Minds"—notice the four initial **M's.**

Or the similarity may be in **sound.** Rhyming is an illustration, where the last sounds of two or more lines in the poem are similar. It is easier for this reason to remember or recite rhymed poetry than it is prose or blank verse.

The similarity may also consist in **looks or appearance.** "John reminds me of Jim"; "This church looks like St. Luke's"; one tune recalls another very much like it; one joke "just reminds me" of another!

It is not necessary for things to be alike **in all** respects in order to be connected in memory. A single point of similarity is often sufficient to effect recall. A person with blue eyes may bring to

mind another person with blue eyes yet unlike in all other respects.

The correspondence, again, may consist of a similarity in **thought or idea.** Synonyms, or words that mean nearly the same thing, recall one another. The words joy, delight, gladness, charm, pleasure, rapture, transport, are all connected by similarity of thought or meaning. By the way, if you enrich your memory with synonyms you will immensely beautify and strengthen your style of address and conversation, rendering your diction much more flexible, pleasing, and effective. "The stars are like diamonds" is a figure of speech called simile; it sets forth a similarity between stars and diamonds. "The giant engine" is a metaphor, wherein an engine is compared to a giant. A parable is a long simile, such as "The Prodigal Son"; an allegory is a long metaphor, like "Pilgrim's Progress." We remember thought better, we recall the meaning easier, when it is polished with simile and metaphor, or expanded into a story by parable or allegory. But they all set forth **similarities in thought.**

5. **Contiguity.** Things closely associated in time or in space bring one another to mind. "Chestnut Street, Philadelphia," suggests "Independence Hall"; "Independence Hall" suggests "Declaration of Independence"; "sea" recalls "ships," because they are so frequently seen together; "my grand-

father's farm" recalls at once "LeFevre Station," because they were near each other.

A German professor tells of a case—an example of many—where a forgotten scene of years before was suddenly recalled and without any apparent cause. But persistent research revealed the fact that the fragrance of a certain flower unconsciously revived the scene because that particular flower was first smelled at that scene years before. You see, the flower and the scene were closely associated together in time and in place, the same time and same place in fact, hence when the flower again presented itself up came the scene, associated thus by a double contiguity.

"Oh, yes! they came here the same year the Smiths were married"; "I read about it the same time the news came of Dewey's victory." These are illustrations of countless examples of association and recall by contiguity in time.

Here are some examples of trains of thought based solely upon the form of association known as Contiguity:

1. Evanston, Chicago, Lake Michigan, the lakes, Canada.
2. Washington, Revolution, early American history, discovery, Columbus.
3. House, yard, alley, field, creek.
4. Five P.M., stop work, home, supper, lodge.

Now then, in these five forms of association, all perfectly natural, strong, and effective, we have what I call the five mental dumb-bells. **If we exercise with these mental dumb-bells the muscles of memory will become strong, enduring, and active.**

I call them also "the big **C's**," or "the big five." This mental railroad of "the Big Five" will carry you a good deal farther than the physical railroad known as "The Big Four." "The Big Four" has three **C's** in it, but "The Big Five" has five. "The Big Four" is a splendid group, and will take you from Cleveland to St. Louis; but "The Big Five" is a far more splendid group, and will carry you from time to eternity.

Association, then, is to treat images, concepts, ideas, laws, and principles in such a way that we can **be conscious of any one or more of them at any time desired.** We cannot readily get them out of the warehouse of Memory if we pitch them in there in any old way or in any old order. A lumber yard consists of **classified** logs, **classified** boards, **classified** beams, and not of a confused jumble. So there must be order in memory. Things in there must be associated according to some plan. And this is just exactly the function of "The Five Big **C's.**"

Mediate or indirect association. As this form of association does not occur more than four times out of a hundred cases it will not be discussed in detail.

The Five Mental Dumb-bells

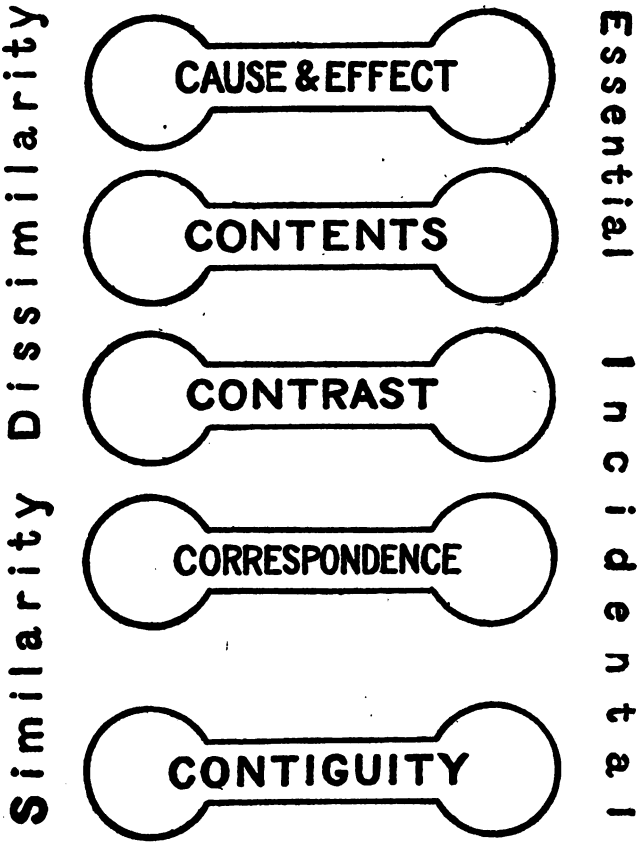


FIG. 19

It consists in finding a middle term that connects the inducing idea with the idea wanted.

Loisette's system of memory was based upon mediate associations, or the discovery of a middle term to connect the two desired to be remembered.

The mind uses mediate association and uses it consciously; all other associations are direct, involving only two terms, the thing needed and the thing recalling it. A chain or train of thought is thus composed, so that there is in reality but one kind of association; and that is the direct with its five forms.

CHAPTER VI

RECALL: HOW TO USE THE DUMB-BELLS

SINCE things enter the mind because they are similar or else so dissimilar as to be practically the opposites of one another, then this is the rule to use when we wish to make them come to mind, when we wish to remember or recall matters needed in our business, trade, or profession.

When a thing comes to us which we wish to remember and it is not likely to be in itself very vivid or striking, **we can make it so by simply coupling it up at once with one or the other of the five dumb-bells,** and when we do this we can readily recall it. This, in a word, is the science and art of remembering.

Essential and incidental relations. We may divide all things we wish to remember into two classes: (1) Things that are connected, that hold **essential** relations with one another; and (2) things that are unconnected, that stand in **incidental** or accidental relations with one another.

Things that are connected stand in the relation of cause and effect, or in that of whole and part. "When we remember causal action we possess a sort of rule or law by which we may create the

results or effects, and do not need to learn them by the use of mechanical memory. Knowing the law of eclipses, for instance, we can calculate all past and future instances, and so we do not care to burden our memory with the historical record of eclipses. In arithmetic, algebra, and geometry we work out the special instances from the general rule applying to them. When a law or principle is once seized the facts are no longer kept in vast storehouses (memory), for they can be deduced when wanted; we look beyond them to their causes."

But disconnected items cannot be so treated. The letters of the alphabet, dates, proper names, news items, orders, and so forth, stand unrelated as a rule. How then shall we remember them? We answer, By bringing them into as striking and impressive relations as possible by means of the other three forms of association—contrast, correspondence, and contiguity.

Some have good memories for "essential" relations and poor memories for the "incidental." The scientist and philosopher are so accustomed to use causal or essential memory that it becomes almost abnormally developed. Agassiz, having mastered the principles of biology, could recognize a new fish from one of its scales—a causal memory (whole and parts).

Exclusiveness of association. In handling disconnected or incidental relations **exclusiveness of asso-**

ciation is the point to be sought, for this makes the union striking and vivid.

For example, if we hear a certain song sung by only one person, then that one person is vividly recalled the moment we hear some one else singing it. Hence the way to use the five dumb-bells is **to run any image, concept, or idea you wish to retain down along the five forms until you come to one it will not naturally fit, and then make it fit in some way.** All this is done, remember, to increase the intensity of the first impression by exclusiveness of association. Let me give you a full and complete example of what I mean:

Example of use of five mental dumb-bells. For business reasons I wish to remember the firm of "Mowmeyer and Graf, Erie, Pa." Now how do I proceed to impress this? I run it down along the five forms thus:

I ask myself, Will the form of cause and effect apply? Yes, for the city is likely the cause of the firm. But that is not striking; it will apply to all firms in Erie.

Then I ask, Will the form of contents do? Yes, for the firm is a part of the whole city. But this, too, is not exclusive or unique.

Well, will the form of contrast apply? Is there a contrast between the firm and the city of Erie? Yes, one is small (in comparison) and the other is large. Again, this is not striking or exclusive.

So I pass on and ask, Is there a similarity between the firm and the city? I thought, and thought, and could discover none.

Is there contiguity? Yes, for one is near the other; but this is the case with all firms in Erie.

By this process I at once see that the only striking relation is to be found by working the dumb-bell of correspondence or similarity, for this will yield a rare and striking correlation. So I set to work, and found that there were two **E's** in the name and in the city name. But the letter **I** in Erie was left. So I said, **"I got left!"**

Further: Is there any sound like Mowmeyer? At once "Moremire" suggested itself, and instantly "Graf" turned into "graft!" So here I had a bunch of daisies—"Mire," "graft," and "I got left!" (Of course I intend no reflection upon the firm. I simply saw the name from the car window as I passed through Erie at the time I was writing this chapter.—S. L. K.)

Now then, how would the mind work in this case, when attempting to recall the name of the firm and its location?

You would say something like this: "I know a firm, but cannot just now recall the place or name. Let me see, where was it? I remember trying to commit it to memory and laughed when I worked out the phrase 'I got left.' That i meant the only

letter in the city's name not found in the firm's name. Oh, I now remember, it was 'Erie.' The two **e's** were in the firm's name, which reminded me of mud or something; oh, yes, 'mire,' 'Meyer,' that's it; and the other was 'graft,' or 'Graf'—Mowmeyer and Graf, Erie, Pa."

Hence, we repeat, run down the five forms until you come to one that will set up some **striking, humorous,** or **unique** relation.

Cause to effect or the reverse. Of course in reasoning from cause to effect or effect back to cause we need no other cue, as already indicated. The same applies to

Whole and part, or part and whole. For example, suppose you had to purchase the following articles down town—spool of white thread No. 30, two pounds of coffee, pair of gloves No. 6, three pounds of steak, three yards of blue ribbon, four pounds of tea, two yards of point lace, ten pounds of lard, four pounds of oatmeal, five pounds of sausage, and ten yards of nine-cent muslin; you could not remember them all in that order; but would simply arrange them in **groups** so that one thing belonging to any group would bring to mind the others in the same group, and thus you could recall the items by the form of contents.

Writing out outlines of subjects, carefully classified, gives a bird's-eye view of the whole and its

related parts, and helps the memory mightily in retaining and recalling the subject. This is the value of tables, diagrams, and illustrations.

Fuller well says: "Marshal thy notions into handsome method. A man will carry twice more weight, trussed and packed up in bundles, than when it lies untowardly flapping and hanging about his shoulders."

Contrast.

"Gather ye rosebuds while ye may;
Old Time is still a-flying,
And this same flower that smiles to-day,
To-morrow may be dying."

This is easy to remember because of the contrasts in it—"rosebuds" or youth **vs.** "Old Time," "to-day" **vs.** "to-morrow," "life" with "death."

Correspondence. Suppose you wish to remember the battle of Waterloo and the general's name who proved victor. The phrase, "Wellington Won Waterloo" will forever impress it. Why? Because of the alliteration (similarity in first letters) and because of the similarity in thought of two syllables, "water" and "well."

Who was the teacher of Alexander the Great? Suppose you wish to remember that all your life. Work it out this way: "Aristotle was tutor to Alexander." Here are two similarities, the capital **A's**, and the sounds of "totle" and "tutor."

Lincoln, Garfield, and McKinley were associated

together by a similarity of horror—our three martyred presidents.

Contiguity. The history of America will illustrate the application of this form. Every American recalls the tremendous meanings associated with the dates, 1492, 1620, 1776, 1812, and 1861, namely, discovery, settlement, independence, defense, consolidation.

Names are associated by contiguity in time with important eras and events in the past: Plato, St. Paul, Isaiah, Alexander, Bacon, Columbus, Washington, Lincoln, Watt, Bell, and so forth.

One of the many ways of working this dumb-bell is to take one date and correlate a number of events with it. Take the Fourth of July, for example. Adams and Jefferson died on the same Fourth of July, 1826; Lee retreated from Gettysburg and Vicksburg (two "burgs") fell on the Fourth of July, 1863.

If you could afford to have one room where you did nothing but pray; another one set apart for the study of science; still another for the reading of poetry, etc., then every time you entered any particular room that associated state of mind and feeling would instantly be recalled and strongly reestablished. **All forms may alternate or irregularly succeed one another.** The usual associations in a "train of thought" are a mixture of all five forms, the mind using one and then another, oscil-

lating between them all in an irregular manner. One link in the train or chain may be furnished by one form, another link by another form, and so on to the end, indefinitely.

Exercises. Name each form of association between the pairs in the following train of thought:

Bessemer Steel	Causation
Steel Railroads	Contents
Railroads Trolleys	(Mark this and the following yourself.)
Trolleys Slow as snail	
Snail Mud	
Mud Diamonds	
Diamonds Rubies	
Rubies Queens	
Queens Heredity	

At the end of the day recall the events of it. Notice which dumb-bell you work most frequently in doing this.

In the morning read over some short quotation or poem and recite it mentally several times during

the day, noticing the five forms as they appear in it. In three hundred and sixty-five days think what a treasury you will have won.

How to fix names. By one or the other of the dumb-bells form some striking association with the name you desire to enregister. Mr. Sheldon gives some examples. He wanted to remember a man's name, Doehring. He used the correspondence dumb-bell, saying mentally, "This sounds like 'Door-ring'." Now he can always recall this man's name. He wanted to fix the initials of D. S. Mitchell, which were forever slipping away from him. He noticed that Mitchell was a diligent student; so he called him Diligent Student Mitchell. The initials have stuck ever since this correlation was made.

When you have gone over the five forms and found one you intend to use for remembering any particular disconnected item, then, by repetition and focused attention, drive it home—drive the nail in Sisera's head far enough to stay.

How to recall forgotten names. Simply go fishing in the deep sea of consciousness with the fivefold line of the Five Big **C's.** In recalling a forgotten name you are always led to it by some track of association, one thing recalling another, that another, and still another, until suddenly the name you are after flashes into mind, having been at last landed there by some point of causation, contents,

contrast, correspondence, or contiguity. Suppose you have a case before you.

Say, "Here's a man from Bloomington, but I can't recall his name." Then mentally run "Bloomington" down the dumb-bells, and if this doesn't yield the desired result, say, "This man is a grocer"; then run "grocer" down the dumb-bells; if this doesn't pan out, take his politics, or his religion (church or denomination), name of his street if you have it in mind, or any point at all about your man, and run them down the dumb-bells, and at some point or other the connections will be made, and the name secured.

Exceptions. Sometimes the connecting link or inducing idea may be so short, quick, or sudden that it will not be noticed. In such cases we seem to remember directly, that is, without any association processes.

I remember a case in my own experience. On February 17, 1900, I wished to find and reëxamine an old article of mine on "Street Corners." I was laboriously going over my manuscripts, two boxes full of them, when I suddenly thought, "Oh, this article is in an alcove in my study table." I went thither and at once laid my hand on the article. Had I gone on through my piles of manuscripts it would have consumed fully an hour of time, and then have failed anyway. What suggested the alcove in my table? Some one thought led to it,

of course, but the revelation came so suddenly and under such excitement that I failed in introspection, and so missed observing the link-thought.

Conclusion. Watch yourself and see which forms of association you most frequently, naturally, and effectively use. Cultivate that kind of memory in which you are weak. Business men should commit to memory passages from the classical prose writers, for thereby they cultivate a good style and correct use of English without detriment to thought. This practice is infinitely to be preferred to the mere mechanical learning by rote of a list of words.

Finally, the very habit of associating, consciously and systematically associating things, will strengthen us **all through,** because we shall then **know** that we have the power to remember when and what we wish to remember. The habit of association is the habit of systematic and related thinking, and it is delightful to feel that we can do this whenever we wish.

CHAPTER VII

RECALL: THE LAW OF REPETITION

BUT what of those events or items which refuse to be coupled up readily with any of the five forms of association?

You can reduce these mental rebels only by a good castigation, that is, by treating them to a good dose of the law of repetition. It is right here, in this class of items, that repetition especially applies and it is the only thing (plus attention, of course) that will apply. Let us take an example:

"James Wilson died December 12, 1905, at Pittsburgh, Pa." Here are facts that you **must remember**—it is vital to your work and happiness and success to remember all this, and definitely, too.

So you begin by running it down the line of dumb-bells: Will causation give us any help? No, we cannot think of any. Will contents? Yes, Wilson was part of the city; but this is no real help. Will contrast? Yes, Wilson was small, the city large; but, again no real help. Will correspondence? No, we cannot think of anything here. Will contiguity? Yes, Wilson at Pittsburgh; but this, too, is no real help.

Now then, this analysis gives us causation and

correspondence to work with for some striking relation or association; but, for the life of me I cannot think of any. Consequently, I am shut out from all, and as a last resort, fly to the labor of repetition. If this fact is **worth** remembering, then **work** to remember it as you work for any other thing that is of **value.** Repeat it verbally to yourself; then repeat it orally; then write it ten times in pencil, ten times in ink, ten times on typewriter; then write it on a small slip of paper and carry it with you in your watch case for a week, or until you wish to replace it with another equally important disconnected and non-assimilable fact for memory.

"With a very vivid first impression," says Professor Scripture, "repetition may be unnecessary;" true, but when, as in the Wilson case, we simply cannot make any striking or vivid impression, then we simply must resort to repetition, for by these little shovelfuls we dig a tract in memory just as deep, finally, as one big steam shovel (a striking impression) will scoop out in one application.

Repetition must be accompanied by attention. Repetition, then, aids retention and recall. But a mere parrot-like, unthinking repetition is waste time and effort. Attention must be enlisted in the work on hand. The repetition must be conscious, and not mechanical.

Of mechanical "committing to memory," Dr.

Watts says, "To impose on a child to get by heart a long scroll of phrases without any ideas, is a practice fitter for a jackdaw than for anything that wears the shape of man."

"Learning by heart" is frequently very far from being "by heart"; instead of the force of fervor being the actuating principle, it is more often the fervor of force—the stick of teacher, or of necessity.

Nevertheless, we simply cannot get along in memory without repetition. Thirty experiences make us recall a thing better than one. This law of repetition is part of the very bone and marrow of our minds.

Rehearsals of a play by a troupe of actors, practice on the piano, and many, many more customs of life-progress are based upon the law of iteration.

It is by repetition that actual habits are formed and fixed, and then we recall so easily that we do it instinctively, almost unconsciously; or, speaking physiologically, the groups of brain cells called into action in the training process discharge themselves or re-function upon the slightest call or provocation —forces act along the line of least resistance—nerve currents move easiest through those tracts which have been most in use, as we choose the beaten path in the forest rather than push through the untrodden wilderness—in short, the acts or thoughts **recall themselves.**

W. T. Harris, late United States Commissioner

of Education, began with one date, added a few more to it, reviewed the list from time to time (that is, repeated it), and so on until his memory covered a large historical field.

A good practice is in your conversations to describe to others what you wish to remember yourself.

Attention plus association plus repetition (or auto-suggestion). The three big A's—Attention, Association, and Auto-Suggestion—constitute the great friends of memory, and make a powerful mnemonic trinity. Or we may view the matter this way: With only five enemies (and they readily defeated) but with ten friends—the five senses and the five forms of association—plus the two generals of the company (attention and auto-suggestion), it ought to go well with Memory, and her pathway to victory be made straight and smooth.

Caution. There is a vast difference between training one's memory and burdening one's memory. It is well to learn how to retain and to recall that which it is needful to have always immediately in mind. It is not well to tax one's memory with the retention of a mass of material which one can easily refer to in available volumes. The mental powers have their limits, and if they are set merely, or chiefly, to the work of memorizing, they cannot be fresh and free for other uses. He who has most to do in the realm of thought and of mental produc-

tion will not attempt to pack the contents of his library into his memory. He will rather train his memory to show him where, in that library, to find the facts and other material to which he has need to refer. The brain is too precious an agency to be used merely as a storehouse. Even if one of us could remember every important fact or thought which ever came into his mind, he would be unwise to try to do so. Deciding what is best to fasten in the memory is a more important matter than merely holding in the memory whatever enters the mind.

"Overburden not thy memory," says Fuller, "to make so faithful a servant a slave." "Memory is like a purse," he continues, "if it be overfull that it cannot be shut, all will drop out of it."

If you try to remember too much, too many things, you may fail in all and remember nothing—the mind breaks down and refuses to work under such a load.

By sound judgment and wise discrimination entrust to memory only what is necessary in your life and labor.

CHAPTER VIII

MEMORY VERSUS REASON

"IT is a matter of every-day comment that much memorizing deadens the power of thought." "A strong memory is commonly coupled with infirm judgment," said Montaigne.

M. Brandt, of the French Protestant mission in Senegambia, commenting on the well-known fact that the memory of Africans is greatly superior to their reasoning powers, ascribes this to the fact that, having no alphabet, they have for centuries and centuries committed everything to their memory, so that it has at last absorbed almost all other mental faculties.

There is not so much attention given these days to the culture of memory as formerly. To-day we have notebooks, diaries, calendars, table records, bookkeepers, statistical tables, reference books, annual reports, and so forth, to keep us informed and up to date. In schools, too, pupils are taught to rely on their reason and not on memory; they are given thought studies instead of memory exercises, and so value the power to think rather than the power to remember.

"Whatever cultivation of memory tends to the

arrest of the power of rational thinking is to be by all means avoided," insists Professor Harris. And with this sentiment we heartily agree.

Persons short in judgment and reason will sometimes be found with a remarkable memory. "Blind Tom," an idiot, could reproduce an entire piece of music on hearing it only once.

But it is also true that persons endowed with strong and keen intellects have also had prodigious memories. Pascal, Leibnitz, Euler, Ben Jonson, Napoleon, Themistocles, Dugald Stewart, all were men of intellectual strength and of giant memories.

Our conclusion is, Cultivate both memory and reason in order to develop ability. In Part I of this textbook we have seen how to cultivate the reasoning powers; and now, in "Memory," we see that two forms are based directly upon reason, namely, causation and contents, while the other three forms demand system and judgment. Consequently, in using and practicing this system of memory culture you are at the same time enlisting and combining the rational factor of the mind; and so both will improve together.

CHAPTER IX

FORGETTING

MENTAL elimination is just as necessary as physical elimination. The body gets rid of waste products by the various processes of physiological elimination. This process of elimination leaves in the body only what can be used to advantage. Similarly with the memory. We should eliminate what is useless—all waste products, which are a burden to the mind as long as they are allowed to remain in it.

This eliminating is done by forgetting, which consists in deliberately casting out of mind what we do not want in it.

Relative forgetfulness. Is there a contradiction here? For we have said that we believe there is no such thing as absolute forgetfulness. No, for we now remark that all experience shows that there is such a thing as relative forgetfulness. Herein lies a great blessing, or a great chance for one.

"If we are to remember usefully," says Professor Titchener, "we must forget a great deal."

If every particular, trifling, insignificant incident of every day should doggedly insist upon remaining before or upon the mind all the time, we should be

buried beneath the mountain of our own memories, and we "should not see the wood for the trees."

We may feel glad that we do not remember all things, for this is the condition of our remembering some. Reason and judgment come in to tell us what should be remembered and what should and must be forgotten.

The need of forgetting. How, then, shall we forget?

How shall we forget our crimes, sins, and unkindnesses, in thought, word, and deed, which trouble and harass our thoughts?

How shall we forget that deep sorrow and poignant grief which darken and sadden the heart?

How forget calamities, misfortunes, losses, the very memory of which draws such large drafts on our life blood?

Ah! how shall we forget those ugly negatives whose dire memory clings to us as tenaciously and often as disastrously as the poisoned robe of Dejanira clung to the rent flesh of the pain-maddened and dying Hercules?

Don't you know that the memory of your weaknesses, sins, and failures keeps you back and down and under—paralyzes your faith in yourself? Honestly, would n't you feel **free, free,** if you could only forget them?

Oh! the curse of an evil memory! It is, as

Thomas Fuller says, "like a filthy pond, wherein fish die soon, but frogs live long."

It is a good thing to have a good "forgettery"—a a fine thing, in fact. How shall we develop this forgettery?

Well, you can't forget by simply saying to yourself, "I'll forget that, I'll forget that"; for the oftener you say that—calling back to mind the very thing you want to push out—the more firmly you rivet it by the law of iteration.

How to forget. But, the way to for-get is to get-for, that is, **get** something **for** (in place of, instead of) the thing you wish to forget—get some other interest, some other occupation, some other thought.

Many are the illustrations that might be massed at this point to demonstrate the principle; but, if it be found that this principle works in an extreme case, in a difficult case, it will encourage us to apply it to lesser ones.

A Hindu, trained in controlling his mind and in directing consciousness to any part of his body ("dirigating"), was badly wounded in the leg; the doctor wished to chloroform him for an operation to cut out the bullet; the Hindu refused to take chloroform; he said, "I will lie perfectly still and will not notice the pain. If I move, however, you may then chloroform me." This was agreed to, and the operation was commenced and successfully per-

formed without the anesthetic. When questioned afterwards the Hindu said, "I assure you I did not feel the least pain. I fixed my consciousness in my head; it was not in my leg; I felt nothing."

He forgot the leg because he got something else (the head) for it.

Don't feel discouraged, then, if your memory seems to be full of ugly things. It can be cleaned out.

Once a young man complained that he could not remember any of the good things he heard, but only the bad stuck in his memory. An old man heard him tell this and bade him take an earthen vessel and fill it with water, and after this was done, he ordered the young fellow to empty it. He commanded him to do this several times. The young man wondered what all this meant.

"Now," said the old philosopher, "though there be nothing of the pure water remaining in it, yet the vessel is cleaner than it was before. So, though thy memory retain nothing of the good thou readest, yet thy heart is cleaner for its very passage through."

The old philosopher has given the correct answer. Go wash!

CHAPTER X

RECOGNITION

RECOGNITION is the third and final function of memory.

Recognition is the inner feeling of assurance that the image, concept, idea, law, or principle recalled is the very one wanted or called for.

"What's the name of the man I met yesterday? Simpson? Simpkins? Simons? Simon? Seeman? Oh! yes! it was Seeman," you exclaim. You recognize that as the recall wanted.

Recognition, you perceive, establishes exact identity between two impressions—the original and the duplicate.

Recognition welcomes mental contents as belonging to our experience. It is a sort of double knowing; I know what is recalled, and I know I knew it formerly.

Recognition is important because without it we could not distinguish between memory and imagination. "The house I have in mind now I recognize as the old farmhouse and it is a fact of my experience; but the ideal house I see in my mind is not recognized as a part of my experience; and, hence, is a product of the imagination." Thus the act of recognition is the crowning activity of the memory.

We perceive ourselves perceiving. We know ourselves knowing.

Pleasure in recognition. Our images and ideas are familiar to us. They come forward into the field of consciousness with the mark or sign of familiarity upon them, which says to us, as Professor Titchener beautifully puts it, "This is your old friend, the image or idea you had before."

"I've been here before," "I'm sure I know that face," "Yes, that's the same idea that Smith gave me yesterday"—these are expressions of the recognition power of memory.

Thus we get to feel at home with our images and ideas; recognition gives us pleasure. The new and the strange always arouse a sort of instinctive recoil in us, unless we are especially in quest of it. But when our own images or ideas come back to us, they say, each one, "Here I am, and I'm just the same that you knew before." Original and reproduction fit exactly, in all details; identification takes place; I recognize the image or idea I have recalled.

Exercise. It is well to practice exact recognition by giving the source of all facts you quote; give the book, title, author, and the page, if possible. Commence to do this. The power will grow. It will train you in accuracy and in reliability in other lines, too. You will **get the habit,** and this habit will prove to be a mine of comfort and may mean a mint of money.

PART III: IMAGINATION

CHAPTER I

THE RELATION OF IMAGINATION TO MEMORY

IMAGINATION is the mental power of combining images into a new image or into a new concept, and concepts into a new idea.

A man's head on a horse's body gives us the image of a centaur, or the concept "centaur." This is a concept of the imagination.

A meadow plus some trees, a stream, and a cow or two, make a new scene; and in this case the image of a landscape is made not by uniting sensations but by uniting images. Now we have seen in Lesson Four that sensations unite to make an image; hence when images themselves unite and issue only in another image and not in a concept, as they should, we have something unusual, something novel, new, unseen, or unheard of before—a product of the imagination.

In short, images obtained from sensations and recalled by memory can be variously arranged by the mind; when grouped by the law of similarity, we call the group a "concept"; when grouped as

they were first observed by the senses in Nature, we call it "memory"; but when grouped in any other way, we call it "imagination."

A man's head is a memory; so is a horse's body, but when these two images (or concepts) are brought together, not according to but against Nature, into a new image, a centaur, the combination is not a memory; neither is it a nature-concept or a true picture; it is simply a product of the constructive imagination.

Memory and imagination. Imagination is content to get an image; but memory is not satisfied until it knows when, where, and how it got that image. I read a description of the battle of Gettysburg and a panorama of men, horses, hills, guns, smoke, and so on, passes before me; but these images are not memories of the battle, for I was not in it; these images of mine as I read that description are simply results of my reconstructive imagination, which reconstructs the total picture from the description of the writer. When my uncle reads that description he has images too, but they are nearly all memories because he was himself present at that great struggle.

I can think of the home of my boyhood. I can picture the house, the garden, the stable, the orchard, just as they appeared when I was a lad at home. This is a picture of memory, pure and simple, the materials being supplied by recall.

But by imagination I can replace the home and

build a new one, enlarge the stable to a barn, plant new trees in the orchard, and thus mentally construct a picture of a new home to stand out clearly before my mind's eye. This is a picture of the constructive imagination; I construct it myself out of materials in my own mind, fancy free.

But again, I can listen to a friend who has just visited that old home as he tells me of the changes in the house, stable, garden, and orchard, and I can picture these changes as he describes them. This is reconstructive imagination.

Imagination is thus based on memory—yours, or that of some one else. This is the reason we study imagination **after** we have studied memory. This is the logical order.

Power of imagination over sensation. Imagine a piece of sour lemon in your mouth! The salivary glands are immediately stimulated and produce saliva. If I imagine myself eating a piece of jelly cake, I experience incipient nausea!

That sensations produce images (memories) so that both are closely and vitally related together, bound up in the same bundle, as it were, is proved by the fact that we can reproduce a sensation by something so intangible as a vivid image in the mind.

I have often done this upon my audiences throughout the country by making an experiment with distilled water. Distilled water, you know, has no smell or odor whatever.

Holding up a bottle of colored distilled water, I would announce that it contained a powerful solvent, and as soon as the cork was removed its fragrance or odor would permeate the atmosphere with a delicate smell, which all who had a sensitive or delicate olfactory sense would at once detect. I asked them all to close their eyes and be ready for the odor. I then uncorked the bottle, and in ten or fifteen seconds one hand after another would go up from the audience; some said they smelled perfume, some camphor, some ammonia.

This proves that an olfactory image held a moment or two in mind with attention focused upon it, will set up its corresponding sensation, and this result proves how intimately image and sensation are connected.

The result, as above described, was an olfactory hallucination; but those whose senses of smell were acute or delicate and whose power of concentration good, did actually function so that they noticed a genuine smell, that is, the olfactory nerves did act, set in motion by an internal stimulus, by mind, by thought power solely and simply.

(This, by the way, has been called by some writers, "re-presentative imagination"; but we call it simply memory, for unless you had formerly experienced a lemon or smells, you could not recall them and would not be affected at all. You might think of a "conlephant" forever and never be affected in any of the senses by it, simply because

you have never seen, heard, smelled, touched, or tasted a "conlephant"; there is no such thing in existence; I coined the word myself; it means nothing that I know of, consequently neither you nor I have any memory whatever to affect us when that sound or word is heard.)

Experiments like these demonstrate beyond question or cavil that the laws of mind are hard and fixed, the same as the laws of matter, and that among these laws is the close relation between sensations and images. If there was no real, vital, or direct connection between them, they could not act and react upon each other as we know they do.

"The imagination processes (processes based on memory)," says Professor James, "can then pass over into the sensation processes; in other words, genuine sensations **can be centrally originated.**" (For further instances, see "Illusions and hallucinations," page 207.)

The man **born** deaf can never be trained to imagine what sound is like, simply because he has no sound-memories; and the man born blind can never reproduce or imagine a vision or sight. (Professor Jastrow, by the way, studied imagination in the blind, and found that if sight is lost before the seventh year of the child's life the visual centers decay and cannot refunction; but if lost after the seventh year, visual imagination survives through life.)

Imagination begins where memory ends. Mem-

ory recalls, brings forward, or supplies the materials which imagination takes up, carries forward, and uses for its own purposes.

Memory refers to the past; imagination builds the future.

Two errors. Some say that imagination is the faculty of reproducing mental copies of things once experienced. This is an error, for it confounds imagination with memory and makes them identical. Such a conception leads to confusion in thought and speech.

Others argue that imagination can construct something out of nothing, that it is entirely ideal, that it is not tethered to real events or memories, and acts without reference to them. Some of our leading psychologists teach this. But I think it is entirely erroneous, "up in the air," and without foundation in fact, for no man can name any product of the imagination that is not grounded on memory. We will make this point clearer in the chapter on "Constructive Imagination" (Chapter III), where its discussion logically belongs.

"Memory is the cabinet of imagination," says Basile. "Almost all that we can be said to enjoy," writes D. S. Johnson, "is past or future; the present is in perpetual motion, leaves us as soon as it arrives, ceases to be present before its presence is well perceived, and is only known to have existed by the effects which it leaves behind. The greatest part of our ideas arises, therefore, from the view

before or behind us, and we are happy or miserable according as we are affected by the memory of our life, or our prospects of future existence, that is, by memory and imagination.

"We really have no future," says Mr. Sheldon, "except what is given us by this wonderful faculty."

Memory, then, calls up the past, and imagination glorifies it, and out of this glorified past weaves the garment of the future, all of which led Napoleon to say, "The world is ruled chiefly by imagination."

Professor Charles Zueblin says that the imaginative man is the only man to succeed, in or out of business. "The good, sound, business man, with a growing bank account to his credit, is the man whose brain is active and alert, and no man's brain ever reached full development unless the imagination was given full scope. The rusty, dull brain of the man who seems not much good at anything is the brain of a man who takes the world as he finds it and lets each day drift by without imagining himself a success. Imagination is the greatest thing in the world."

Mr. Sheldon writes: "You may suppose your toil and eagerness to be prompted by cold reason, but is this true? Did you never look out beyond and image yourself in favor, success, and prosperity? Have you never pictured yourself as opulent, or at least a well-paid manager or foreman? If the future has thus called to you, remember it was imagination that gave it voice. It has shaped your reason, it

has stimulated your purpose; it has filled you with glad enthusiasm for the work you are now engaged in. And let me ask how you can measure the worth of such a faculty, when you consider that it plays this part in all the dearest projects and purposes of your life?"

Material progress is mind materialized. What is any machine, but mind materialized? What is any invention but imagination actualized? What is any item of progress but an idea born into life?

This age is impatient with all that type of thinking which **produces** nothing, but this age fairly worships all constructive thought.

To build their greatest pyramid, it is said, the Egyptian slaves, one hundred thousand of them, labored for more than twenty years yet to-day, in Pittsburgh alone, a pyramid, not of stone but of steel and coal and glass, is erected every four weeks. Not only a Carnegie, a Frick, and a Kennedy, but thousands of the unknown rank and file have multiplied Pittsburgh's greatness by their thought and imagination, by the industrial dreams they have dreamed—the visions of things which first formed themselves in the matrix of the imagination.

Let our business men and workers in this great commercial age, the greatest of all history, dream dreams, and let them see visions, for generations yet unborn will rise up to call them blessed.

CHAPTER II

RECONSTRUCTIVE IMAGINATION

THERE are two kinds of imagination, Constructive and Reconstructive, otherwise known as creative and recreative or as productive and reproductive—constructive, creative, and productive referring to one kind, reconstructive, recreative, and reproductive to the other kind.

We do not, as many teach, see any room or necessity at all for a third kind of imagination, called "representative," which is defined as that mental power which recalls former experiences, for we contend that such a power is memory pure and simple. It makes the field much clearer and avoids much confusion in thought to always call this recollective power "memory," leaving imagination to be conceived of as only of two kinds, which have been named above.

Constructive and reconstructive imagination contrasted. Constructive imagination combines images into new images or new concepts, and concepts into new or more complex ideas. For example, you can think of a book a hundred times larger than this book in every way, in length, breadth and thickness. Any simple change in the features of any simple

mental image derived from sensation constitutes constructive imagination; it initiates a change. Whether these changes are useful or not is another question. Models, pictures, drawings, symbols, designs, are all exercises of the constructive imagination. The richness and freedom of this power depends upon our previously acquired images and concepts, their number, vividness and accuracy, and right here the instruction on thinking and sense training applies with tremendous force.

Examples of constructive imagination. I can take four simple things like four straight lines and combine them in a manner never before seen on earth, to my knowledge. Can you? If you think this out, you have constructive imagination.

You can draw or write a description of a house never before seen in all the architectural designs on earth. To do it, you must exercise constructive imagination, originality, mental initiative. Indeed, the culture of constructive imagination is the development of originality.

The novelist uses constructive imagination, but the reader of the novel exercises reconstructive imagination, he reconstructs in his own mind the scenes created for him by the writer.

To appreciate fully what the creative artist writes or describes, the reader must have an imagination equally good; he who is to appreciate Wagner's

music must have the imagination of a Wagner and reconstruct what the great composer originally constructed; "spiritual things are spiritually discerned" is the psychology of a St. Paul.

It really takes a Shakespeare to appreciate fully a Shakespeare.

If you can reproduce vividly and accurately what you have before seen, heard, or felt, you have a good memory; if you can mentally reconstruct anything described to you by another so as to hear, see, or feel it as the other hears, sees, and feels, you have a fine reconstructive imagination; and if you can create an object (a thought, picture, poem, music, machine, method, enthusiasm) not created before, so far at least as you are concerned, you are the possessor of a good constructive, creative, or productive imagination.

Reconstructive imagination. In reconstructive imagination, if your writer or speaker employs an image or a concept you have never met before you cannot fully and adequately reconstruct his image or catch his meaning until you visit the object that gave him the image or go to the dictionary and learn the meaning of the word he used. So that the richer your own knowledge and experience is, the better you can reconstruct the thoughts and pictures of others; the richer your imagination grows the better it can interpret that of another; the more

memories you possess, the more colors and tints you have with which to repaint mentally the model displayed before you, or construct one of your own.

The words of a vital, interesting story are the symbols of imagined scenes; and if the reader is to visualize and see the pictures and feel the emotions described, he must himself not be devoid of imagination in order to reconstruct what the novelist has first constructed.

"The Last Days of Pompeii" exhibits great constructive imagination on the part of the author and demands reconstructive imagination on the part of any reader if he pretends to appreciate and enjoy that masterpiece.

Many an artist can say to many a fault-finding critic, "You are too matter-of-fact; you have no imagination. If you had, your criticism would be transformed into laudations."

You may never have seen a whale or a volcano, or felt an earthquake or landslide. Yet you have pretty well-defined images in your mind of what these things are. How did you get them? They are due to a combination of picture and description and the life-like result of reconstructive imagination which puts pictures of your own memory into the compound, that is, you compare the earthquake to some shaking up you have experienced, multiplying it by one hundred, or you picture the whale as the catfish you caught in the mill pond,

but with all its dimensions quadrupled a thousand times, and so on.

Differences in imaginative power. Strange as it may seem, nevertheless it is true that educated people have less visualizing or picturing power than the uneducated. "To my astonishment I found that the great majority of the men of science to whom I first applied protested that mental imagery was unknown to them," writes Galton after sending out his list of questions. "On the other hand, when I spoke to persons whom I met in general society, I found an entirely different disposition to prevail. Many men, and yet a larger number of women, and many boys and girls, declared that they habitually saw mental imagery, and that it was perfectly distinct to them and full of color."

"I am myself a good draftsman," writes Professor William James, "and have a very lively interest in pictures, statues, architecture, and decoration, and a keen sensibility to artistic effects. But I am an extremely poor visualizer, and find myself often unable to reproduce in my mind's eye pictures which I have most carefully examined."

In constructive imagination, however, the educated seem to hold the balance of power. Consequently, the educated excel in one form, and the uneducated in the other.

Imitation and play. Imitation is simply the reconstruction of what one has seen another construct,

the doing of what one has observed another do. Play consists largely in the same thing. "This is the way the farmer sows his grass," and the imitative motions are reproduced. "Make believe this stick is a horse," and away they go on their hobbies. It is all reconstructive imagination.

Sequin, in his report on the educational exhibit at Venice, said: "The nations which had the most toys had, too, more individuality, ideality, and heroism." And again he says, "The nations which have been made famous by their artists, artisans, and idealists, supplied their infants with toys."

Lies there not a significant and profound hint to the wise in this simple fact of history?

Sympathy is vivid reconstructive imagination. A gentleman on entering his house one day crushed the finger of his little girl at the door. At the moment he himself felt a violent pain in the corresponding finger of his own hand, and the pain lasted with him for three days.

One day Sydney Smith saw his grandchild pat the back of a large turtle. He paused and asked why she was doing that. The little maid replied, "Grandpa, I do it to please the turtle." "My child," he answered, "you might as well stroke the dome of St. Paul's cathedral to please the pope." But what was the little girl really doing? She was indulging her imagination; she was exercising and developing her sympathies. Abraham Lincoln did the same when he paused to pull a pig out of a pond.

Intensity. George H. Meyer, a psychologist of Germany, could visualize (reproduce visual images) so vividly as actually to see colors, forms, figures before him, which no one else near him, of course, could see at all.

Many people, especially the uneducated (as Galton and James discovered), possess a similar power. This visualizing power is intensified under excitement or expectancy. Thus many "ghosts" and ghost stories have arisen, and from perfectly honest and trustworthy narrators.

Re-imaging **auditory** images is a rarer power; nevertheless, thousands are the cases where people of the ear-minded type have heard voices and words, communications and messages, the whole being, of course, purely a subjective phenomenon, a product of the reproductive imagination.

The motor-type or touch-minded will feel touches on various parts of the body—again a product of the reconstructive imagination.

Imagination thus not only may but actually does frequently **lead its subjects astray** by producing what are known as illusions and hallucinations.

Illusions and hallucinations. Let us first look at some illusions. Have you ever seen a public magician place a large box on the table, which he unlocks, and take out of it a smaller box, then unlock that and take out one still smaller and so on, until he comes to the smallest, which he takes from the edge of the table **as if** it, too, came out of

the next largest box? Thus, the smallest box, in which the borrowed ring is always found, never was inside all those other boxes, but the imagination of the audience is misled by the actions of the magician and reconstructs his idea as he intended it, namely: the emergence of the smallest box from the next preceding. It is all an illusion, deftly produced to appeal to the reconstructive imagination of the spectators.

The disappearance of the orange in mid air is explained in precisely the same way. The magician sits behind a table and throws an orange two feet in the air, catching it in his hand and dropping that hand behind the table; again it is thrown up, but this time twice as high as the first, and again it is caught behind the table, but before he makes the motion of throwing it the third time, he drops the orange into the other hand behind the table, and with the empty hand makes the throwing motion for the third and last time. Nine tenths of the public would swear that they saw the orange disappear in mid air. Their reconstructive imagination is again misled by recent memories and expectations.

Violinists use the imagination of their audiences in diminuendo terminations. After getting softer and softer, and still more faint and soft, they continue to draw the bow over the strings but are careful not to touch them at all, so that while no tone whatever is produced the audience imagines it deli-

ciously pianissimo, unspeakably soft, and is carried away with it!

Imagination is a great power and can be called forth to curse or to bless mankind.

The violin diminuendo is an illusion, caused by an **external** thing, namely: the motion of the bow near the strings. Legerdemain is all illusion.

But hallucinations are caused not by **external** objects but by **internal** thoughts, expectations, fears, and hopes. The figures and "ghosts," the voices and touches before described are hallucinations. The sick are often troubled by these internally initiated phenomena. But the well, under excitement, often have them, too.

Exercise. Read over this poem of Walt Whitman, entitled "To a Locomotive in Winter," and as you read reconstruct the visual, auditory, and olfactory images as vividly as you can:

"Thee in the driving storm even as now, the snow,
the winter-day declining,
Thee in thy panoply, thy measur'd dual throbbing
and thy beat convulsive,
Thy black cylindric body, golden brass and silvery
steel,
Thy ponderous side-bars, parallel and connecting-
rods, gyrating, shuttling at thy sides,
Thy metrical, now swelling pant and roar, now
tapering in the distance,
Thy great protruding head-light fix'd in front,

Thy long, pale, floating vapor-pennants, tinged with
delicate purple,
Thy dense and murky clouds out-belching from thy
smoke-stack,
Thy knitted frame, thy springs and valves, the trem-
ulous twinkle of thy wheels,
Thy train of cars behind, obedient, merrily follow-
ing,
Through gale or calm, now swift, now slack, yet
steadily careering,
Type of the modern—emblem of motion and power
—pulse of the continent,
For once come serve the use and merge in verse,
even as here I see thee,
With storm and buffeting gusts of wind and falling
snow,
By day thy warning ringing bell to sound its notes,
By night thy silent signal lamps to swing.
Fierce-throated beauty!
Roll through my chant with all thy lawless music,
thy swinging lamps at night,
Thy madly-whistled laughter, echoing, rumbling
like an earthquake, rousing all,
Law of thyself complete, thine own track firmly
holding,
Thy trills of shrieks by rocks and hills return'd,
Launched o'er the prairies, across the lakes,
To the free skies unpent and glad and strong."

As you reconstruct all the images which Whitman originally constructed, the richness and beauty of the whole conception will flood-tide your heart, and you will find yourself almost loving this giant machine, this steam-titan of peace in our land. Your mind begins to be a kingdom to you.

Some general rules. Here are some general rules which I wish to offer for the cultivation of reconstructive imagination:

1. Read fiction. Select the best.
2. Read poetry. Get standard and classical productions.
3. Read biography, and emulate the virtues of great men.
4. Visit art galleries whenever you can.
5. Go to concerts.
6. Take in the drama.
7. Study Nature. Watch her in all her moods. Follow her in her greatness and do not draw back from her microscopic marvels.
8. Study style—simile and metaphor, parable and allegory.
9. Take up drawing and manual training.

And now to sum up a bit: Memory re-images our own images; reconstructive imagination re-images another person's images, whether he describes them for us in words, tones, drawings, paintings, carvings, buildings, machines, or gestures. Memory

handles, unchanged, our own mental contents; reconstructive imagination handles another's mental contents, also unchanged; but constructive imagination handles and changes them after its own peculiar fashion, to which subject we now turn in the following chapter.

CHAPTER III

CONSTRUCTIVE IMAGINATION

THE imagination often acts involuntarily. This is the case with most people, in fact, because they have never thought of training this power, since they rest under the delusion that it is too wild and disorderly, and by its very nature non-susceptible to scientific treatment. And so images and thoughts are allowed to come of themselves, without any effort of the will or of intellectual guidance. This haphazard method has often been dignified with the name of "inspiration."

By curious accident or recondite laws of consciousness some of it has been; but may the gods deliver us from the balance of it, if it is to stand as the exponent of supernal inspiration!

We often sit in meditation, in a dreamy state, lazily watching a train of thought, so called, which seems to move without volition or guidance—past thoughts, new ideas and fancies, sane and distorted, grotesque and serious, all blended together—the day-dreams of childhood or the air castles of manhood, and in all this chaff we do occasionally find a grain of wheat.

Voluntary imagination. Although images, figures,

and new ideas often spring up involuntarily in consciousness, yet they may be produced scientifically and systematically by a direct effort of the will, and this is the art we all really wish to cultivate.

In exercising voluntary imagination we deliberately, definitely, and systematically search among our memories and, by the forms of association, assemble the elements that are fitted to enter into the new compound we seek.

As familiar illustrations of this method take the great paintings entitled "The Conception" of Murillo and "The Transfiguration" of Raphael. They are idealizations; yes, but they rest heavily upon **the actual,** upon faces, figures, forms, individuals whom the painters themselves had seen—memories voluntarily recalled and recombined. Hence we state:

The law of constructive imagination. You cannot imagine anything the elements of which you have not sensated. This is simple, but it is sweeping and fundamental. It means that it is simply impossible for you to imagine anything whatever in any department whatever the elements of which have not been gathered by one or more of your senses at some time previously in your life and experience. In reconstructive imagination you may use another's memory; but in constructive imagination you've got to use your own.

Example. Did you ever see a tree whose trunk

was curved like the letter **S**? No; but you can readily imagine it. Why? Because you combine two well-known and common concepts, "tree" and **"S,"** both of which you derived through the sense of sight. Did you ever see a tree whose trunk was straight but whose limbs were all curved regularly like great big **S's**? No; but you can imagine it and draw it on paper. Why? Because here again you combine the same two concepts "tree" and **"S,"** but in a little different way than in the preceding case. Therefore we repeat the law that **you cannot imagine anything the elements of which you have not sensated.**

The law denied. This proposition has long been disputed by psychologists of high standing. They do it to glorify imagination so as to make it appear a god-like mental power independent of so gross a thing as matter. They think imagination can construct something out of nothing, *de novo,* magically, by *auto-fiat,* as it were. They refer, as proofs, to artists weaving glorious beauties out of their own minds, without any reference to Nature, and they then say, "These beauties are not copies of anything in Nature." Many people still hold to this conception of imagination.

But the answer is simple: These beauties of their art could never have been created unless they had sensed their elements at some time in their lives. Did they paint a beautiful tree such as Nature her-

self does not produce? This grew out of three concepts which they did derive from Nature, namely: "tree," "color," "symmetry." Did they body forth a lovely Madonna? This rooted itself in "woman," "child," "color," "curves," all of which they did see, and combined in a new co-relation. Consequently all who argue for the ethereal doctrine or occult nature of imagination are manifestly misled by fail-

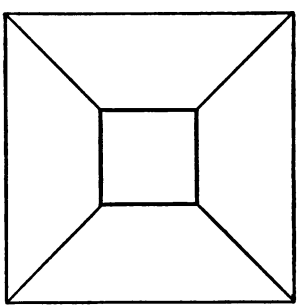


FIG. 20

ing to perceive the difference between the elements of a compound and the compound itself. No man can name anything under or above the sun, a product of man's imagination, however strange and extraordinary, which cannot be analyzed into its own elements, and these elements will be found to be very common things indeed, which man has seen, heard, smelled, touched, or tasted.

Coupling of concepts. In the coupling of concepts is the secret of the whole matter. Is this figure (Fig. 20) a tunnel through which you are looking, or a truncated pyramid with its cut-off top turned toward you? You can make it either, according to which set of concepts you combine. (Wundt, Witmer, and others call this "apperception," and Lewes "preperception.") If you combine the concepts "tunnel" and "seen longitudinally" you get one result; but if you combine "pyramid," "lying on its side," "top cut off," "top toward beholder," you get quite a different result. The objective elements are precisely the same, merely twelve straight lines; but the subjective elements (where imagination reigns) are entirely different.

The coupling of the following four concepts—fence, plus sheep, plus leaping, plus succession—yields one picture, but fence, plus flies, plus leaping, plus succession, yields quite a different thing; one is sensible and the other is absurd, but the point I want you to underscore is that **both are grounded on the commonest concepts conceivable.** It is in the combining of the common that we arrive at the uncommon, and in the relating of the known that we discover the unknown.

Thus we are led back, again and again, to the fundamentals of memory. Witmer is right when he says, "Memory-images reproduce with considerable fidelity former perceptions; the images of imagina-

tion are more unusual and accidental, but nevertheless their component parts are **never absolutely foreign to past experiences,** no matter what oddities their combination may present."

Hence the practical point for us is to well stock the memory. The memory is the great lumber yard whence imagination draws its materials. Increase your images and concepts and you immensely increase the number of possible combinations and couplings. A mind with one hundred concepts manifestly possesses more material for orginality and fertility in ideas than a mind with only ten concepts.

Association is the fundamental process. No one doubts that the faculty of memory can be strengthened. No one should doubt that the faculty of imagination can likewise be developed and strengthened, for the fundamental law of the one is the fundamental law of the other. The secret of memory is the law of the association of images, concepts, ideas; the secret of imagination is this same law of association—the association of images and concepts. Each depends upon establishing relations.

In fact, association is the key word of the whole mental life—of thinking, remembering, and imagining. The process of imaging is a combining of sensations; the process of conception is a combining of images; the process of ideating is a combining of concepts; the process of reasoning is a combining

of ideas; the process of recalling is a combining of any of these various mental contents; and the process of imagining is a combining of images and concepts.

Well, then, how do these three (thinking, remembering, and imagining) differ? Thus:

In imaging we combine sensations just as Nature gives them to us.

In conception we combine images just as Nature gives them to us.

In ideating we combine concepts just as Nature gives them to us.

In reasoning we combine ideas just as Nature gives them to us.

In remembering we combine mental contents just as Nature gives them to us.

In imagining we combine images and concepts in a way which Nature does **not** give us, in a way which is our own, a way which inspires within us a glorious sense of freedom, mastery, and actual creative power. These products of ours Nature may approve, and many of them she may disapprove; that is another question which we will study in a moment. But the key thought here is that the mystic work of imagination consists in the coupling of concepts, the association of common mental contents.

Confirmed by history and invention. Let us turn to the unchangeable records of the past, a wonderful

page in history, the page of modern scientific discovery and invention, and see whether, upon close analysis, the various steps in human progress have not consisted in the simple process of associating concepts which had not been associated before. Let us see if the bewildering wilderness of invention and discovery cannot be transformed from chaos to cosmos by such a simple thing as the coupling of concepts.

Imagination built the electric dynamo. "Electricity," "magnetism," two concepts in physical science; any connection between the two? Any union between them possible? Hans Christian Oersted, of Denmark, thought of this, and asked Nature. And down in the laboratory she answered him, and the answer she gave was "Yes." And lo! a new idea incarnate, for Oersted found that a current of electricity passing near a magnetic needle (ordinary compass needle) made it turn so as to lie directly across the path of the current. This was the marriage of electricity and magnetism—fitted by Nature, married by man—a union which has been blessed with many honored and powerful children.

Andre Ampère took up the subject where Oersted had laid it down. From the known he, too, in his turn was going to step out into the unknown. His idea grew up out of two simple concepts, namely: (1) a magnetic field; (2) another magnetic field. How would they act? If two electric currents, each

generating its own magnetic force at right angles to itself, were placed parallel, what would be the result? He, too, as he sat dreaming in his room, did not try to spin the answer out of his unaided head, without any reference to Nature; no, he went and respectfully asked Nature. And she showed that if the electric currents were sent in the same direction through the parallel wires they turned toward each other (attraction), but if in opposite directions they would fly apart (repulsion).

Then came another idea into the minds of men by combining the above concepts with a very simple one indeed, the concept "bar." Why not place a bar between the wires and have it receive the magnetic currents circulating there? Would not this turn the bar into a magnet? And it was so.

Instead of two wires, why not have one wire twisted into a spiral, and place the bar in it? Would it not magnetize the bar? And this, too, was so. The concept here was simply "a spiral." Its addition opened up a new world in dynamics.

Then said Michael Faraday, pupil of Sir Humphry Davy (who, by the way, had a wonderfully retentive memory), "Well, if a current going round a bar makes a magnet, what would happen if we put a real magnet inside of the spiral? Would not the wire revolve around it if the wire were loose and the bar fastened, and would not the bar-magnet revolve if the wire were fastened and the bar loose?

And this, too, was all so. And lo! the dynamo baby was born. Other inventors nourished and fed him, and now, what a giant he has grown to be!

Imagination and photography. Prism—sunlight—seven colors—black region below the red: In 1880 Herschel wondered what was in that dark region below the red, that region of night, region of silence, region of mystery. His imagination thought **something** must be there, and it set him to work. He soon found out, namely: that the hottest rays of the sunlight lie there, the caloric rays, the heat-section of sunlight.

Then the thought naturally came, What lies at the other or opposite end of the spectrum, above the violet rays? That was a dark region, too. And lo! Ritter of Jena found that peculiar chemical effects were produced, and that nitrate of silver was turned black when held in this region of night. This gave a hint, roused the imagination of another mind, and in 1839 Daguerre made photography a success.

Take the concepts "heat" and "light." Can the heat be increased and the light diminished? Bunsen asked Nature and she said "Yes," and the Bunsen burner is the everlasting affirmative she made him.

Cotton, plus small seeds, plus wire screen, plus revolving saws, led Eli Whitney to the cotton gin.

Boat, plus revolving oars, plus steam engine—we all know what that combination revealed. Robert Fulton first taught us.

Photography plus electricity is a problem in scientific addition which Professor Elmer Gates has solved for us, and lo! the electrograph. Beautiful! Wonderful! Fine as the filaments of the spider web, orderly as a fern, irregular as the lightning flash! The laboratory at Washington, D. C., is decorated with these creations of electrography.

Divorce of facts and forces. Nature not only favors marriages between her forces and facts, but she also at times encourages divorces. Burbank, the Wizard of the West, the high priest of horticulture, has performed the ceremony several times; he has divorced spines from the cactus, fading from flowers, pits from plums, and so on, to the astonishment of Dame Nature herself and all the rest of us. He juggles with biological concepts as a Japanese magician handles his mystic brood of balls.

Imagination and business. Come to so-called "sordid" business. Even there the inspiration of coupling concepts can be felt. George Borgfeldt, manager of a great toy firm in New York City, had his imagination stirred within him over so apparently insignificant a thing as a toy. The first process was to lay in material for his imagination through the channels of the senses. He **observed** that the toys were manufactured in widely separated countries all around the wide, wide world, and in obscure, out-of-the-way, and hard-to-get-at places, in the humble homes of skilled artisans and specialists;

he observed that all these facts greatly increased the expense in placing orders and getting the goods, on the part of all toy dealers in America. This was the in-filling process, and all this constituted the mental material lying in the storehouse of his memory.

Now, how shall he use it?

His biographer says "he conceived the idea." Ah! there you have it—historically true and psychologically sound—"he conceived the idea," that is, he united several concepts into a new idea. What were those concepts? "Toys" and "representative exhibition." In other words, he formed the plan, imagined the process, pleasure, and profits, of assembling in New York samples of all the toys from every point on earth where they were made. He dreamed of this exhibition, thought out and imagined all the steps and details necessary to accomplish it, and then set to work (got action) and actually accomplished it, so that now all the dealer has to do is to consult Borgfeldt & Company, which simple proceeding saves every one the enormous investment in time and money of a devious trip abroad.

"Natural gas" and "lighthouse"—two concepts widely separated since the creation of the world, brought together at last and bound up in one bundle by Tom Campbell in 1828. Campbell was lighthouse keeper at Barcelona Harbor on Lake Erie. A mile distant was a noted "burning spring." Tom put a fishbarrel over this spring, laid a pipe made of

pumplogs from it to the lighthouse, and lighted a flame that burned for thirty years. But Tom really lighted up a good deal more than that lighthouse. He opened up the age of natural gas. He lit up the faces of steel men with the sheen of a **new idea.** That light has really illuminated the world.

More triumphs of imagination. If we glance into some of the humbler lines of invention we shall find that the same principle of the coupling of concepts reigns there as completely and serenely as anywhere else. "Chair" and "table"—two concepts in mechanics. Any union possible? Yes; for to-day we have school chairs, Baltimore lunch chairs, operating chairs, and others. "Chair" plus "couch" yielded the Morris chair; "chair" plus "cuspidor" gave us the dentist's chair. Can you combine "chair" and "bookcase," "chair" and "piano"? "Chair" plus x (putting many things, one after another, in the place of the x) will lead to many new ideas for the carpenter and cabinetmaker.

"Megaphones" plus "telephone receivers," plus "one telephone," plus "musician," gave us the transmittograph, which delights open-air audiences, however large they may be, running up into the ten thousands or more.

To-day we are making paper from peat, alcohol from sawdust, rubber from wheat, and so on *ad infinitum;* and what the vitalized imagination of man will do in the future the gods only know. But one

thing we mortals do know now, and that is, that the method of the past, the method of finding out new combinations, the method that was used **unconsciously** and unsystematically, is to be the method of the future, with this one great difference, that it will be employed consciously, systematically, exhaustively. Method will take the place of accident or chance. This is the central point of this textbook, to which all else is intended to lead up; and to this important point we devote the following section.

Systematic Constructive Imagination

The method is easily understood, and simple. Here it is: (1) Make an inventory of all the concepts in your department of Nature study or sphere of human activity; (2) study their interrelations by combining each one in the list with every other one in it.

Making a table of concepts. Make a list, a written list, an exhaustive list, of every known fact, item, implement, law, and method, connected with your department of thought or labor; in other words, make a complete collection of the concepts of your department. For example: in electricity, to date, there are about 1,600 concepts of varying complexity, and about 11,600 ideas which have arisen from their combinations; in acoustics there are 4,900 concepts, and about 6,190 ideas. These numbers are

taken from reports by Professor Gates, who has experimented in these two sciences. These numbers will vary, of course, as other additions are made.

To furnish you a clear example or illustration of what I mean by making a list, I have prepared the following table of concepts pertaining to the iron and steel industry:

1. **Balls.**
2. **Cylinders.**
3. **Coal.** 4. Bituminous. 5. Anthracite. 6. Charcoal. 7. Coke. 8. Cannel coal.
9. **Gases.** 10. Air. 11. Blowers. 12. Compression. 13. Engines. 14. Fans. 15. Pumps. 16. Steam. 17. Windmills. 18. Vacuum. 19. Velocity.
20. **Heat.** 21. Bagasse. 22. Conduction. 23. Convection. 24. Dust. 25 Fuel. 26. Gas. 27. Electricity. 28. Peat. 29. Petroleum. 30. Sawdust. 31. Steam. 32. Ventilation.
33. **Insulation.**
34. **Iron.** 35. Cast. 36. Wrought. 37. Malleable. 38. Non-malleable.
39. **Lubrication.**
40. **Mines.**
41. **Metals.** 42. Alloys. 43. Aluminum. 44. Antimony. 45. Bismuth. 46. Cadmium. 47. Copper. 48. Gold. 49. Iridium. 50. Lead. 51. Magnesium. 52. Manganese. 53. Mercury. 54. Nickel. 55. Platinum. 56. Silver. 57. Tin. 58. Zinc.
59. **Ductility.** 60. Tenacity. 61. Infusibility. 62. Resistance to shock. 63. Tensile strength. 64. Working strain. 65. Compressive strength.
66. **Materials.** 67. Angles. 68. Arches. 69. Belts. 70. Bloomers. 71. Bolts. 72. Cables. 73. Columns.

74. Cams. 75. Flanges. 76. Fire-brick. 77. Gearing. 78. Hooks. 79. Legs. 80. Lathes. 81. Nails. 82. Plates. 83. Pillars. 84. Pivots. 85. Pipes. 86. Rivets. 87. Rope. 88. Sheets. 89. Springs. 90. Slides. 91. Taps. 92. Tees. 93. Tubing. 94. Wire. 95. Valves.

96. **Ores.** 97. Earths. 98. Quartz. 99. Sand. 100. Clay. 101. Cement. 102. Salt.

103. **Steel.** 104. Bessemer. 105. Blister. 106. Crucible. 107. German. 108. Mitis. 109. Open-hearth. 110. Shear. 111. Puddled. 112. Corrugated. 113. Rolled.

114. **Water.** 115. Still. 116. Moving. 117. Siphons. 118. Turbines. 119. Waves.

120. **Wheels.** 121. Solid. 122. Hollow. 123. Spoked. 124. Cog. 125. Cam. 126. Pulley. 127. Windlass. 128. Screw. 129. Fly.

This is simply an illustration. It is not, of course, a complete or exhaustive list. Every one of those items could be subdivided. Several hundred pages would be necessary to present a complete table of concepts in the iron and steel industry. In this example the arrangement by groups is alphabetical; it might just as easily be arranged according to subjects or departments. Both arrangements would be fine, for they would supplement each other and offer many suggestions along the way. The matter of arrangement is left to the taste and convenience of each worker or student. If done in neat handwriting the book could be carried as a pocket companion —the fountain of many, many ideas and practical suggestions.

Using table of concepts. How shall the table of concepts be used after you have it made?

If you have any special problem to solve, or any particular invention or modification of an already existing invention to make, select those concepts in your list which more directly apply to that particular thing you seek, and then see how you can combine those you have thus selected out of the entire list.

Combine 1 with 2; that combination will give you an idea; then combine 1 with 3; that will give you another idea; then 1 with 4, which will yield still another idea; and so run concept number 1 down along the entire line of selected concepts, or until such point when the idea you seek is forthcoming.

But if you finish with concept No. 1 without result, then take up concept No. 2, and combine it first with 3, then with 4, and so on to the end; this process will give you another complete set of ideas. Then take No. 3 down the line to the end—another whole set of ideas; then make No. 4 run the gauntlet; and so on until you find the idea you are searching for, or, in case you wish to make a veritable thesaurus of new ideas, until you have treated **every concept in your list** to a relation with every other concept in it. This list of concepts and such use of it as just now portrayed, is, you will observe, almost an **exhaustless fountain for new ideas,** which, by this process, multiply in rapid geometrical ratio.

Make new and striking combinations. We are

so accustomed to associate concepts that lie close together in human experience or in Nature that the ideas thus produced are common property to all—prosaic, ordinary.

For example, let us take concept No. 1 in the sample iron and steel list given a few pages back, and let us couple it up in succession with concepts 121, 122, 123, 124, and 125. The coupling with 121 and 122 will yield only very ordinary and common ideas; but the combination of 1 with any of the others will give us some new ideas; for, how would spoked balls, cogged balls, or cam-balls work? How would they act on each other, say two cogged balls? What actions would develop or be made possible? What power transmitted? It might not be a bad thing for some reader to carry these ideas into the workshop or laboratory and find out.

In just this simple way a thousand and one new ideas may readily and quickly be discovered.

Systematic imagination at work. Professor Gates himself, to whom, as discoverer, I am indebted for this method of combining concepts, has worked out many new ideas with it, over one hundred of which (most of them inventions, but a number bearing the dignity of actual discoveries, that is, discoveries of **laws** and **principles**) have been duly patented and protected by the government of the United States, with many more pending. I saw machines working in his laboratory which will astonish the world when

put upon the market—these machines in solid steel, silver, or gold, bearing incontrovertible witness to the practicability of the psychological methods for which Professor Gates particularly stands, the clearness, simplicity, and value of which to mental development I cannot too highly commend, and which, in these textbooks, in my own way, I have tried to make as clear, simple, and valuable to the student as within me lies.

Is it not strange that this method of working the imagination for getting new ideas was not thought of before?

The answer is that we do find traces of it, as we do of all discoveries when searching the past in the light of the discovery.

Recently I read Mr. Spencer's "Autobiography," and I found a passage in which he says that he thought of a method for making new patterns for textile fabrics, printed or woven, wall papers, and other things.

"Could there not be a methodic use of components of designs, so that relatively few ideas should, by modes of combination, be made to issue in multitudinous products? And could not this be so done that draftsmen might produce them with facility, the system serving, as it were, not as a physical kaleidoscope, but as a mental kaleidoscope?"

These "components of design" which Mr. Spencer mentions correspond exactly to the "concepts"

under discussion in this chapter, and their function in producing ideas. As the combining of two or three or more of these "components of design" would issue in an entirely new pattern, so the combining of two or more concepts that had never been combined before would issue in the conception of a new idea that had never been conceived before.

James on constructive imagination. Professor James says: "Much of our thinking consists of trains of imagery suggested one by another. If habitual contiguities and similarities predominate, we have a prosaic mind; if rare contiguities or similarities have free play we call the person fanciful, poetic, or witty," that is, imaginative. He should have added also "inventive."

It is just this adjective that we wish to add to the usual list, and add it with emphasis, calling attention again to the fact that you now know how to find those rare contiguities and how to make those rare similarities.

The poet, genius, inventor, author, sees similarities where the ordinary masses see none; he sees rare similarities; most people see the usual and the ordinary; a poet will see a rare similarity between so common a thing as a country road and freedom, and when we reconstruct what he has constructed we, too, shall see what he sees and in consequence feel enlarged, uplifted, renewed.

From two old concepts "country" and "road"

we see something new, a new beauty there, namely: "freedom." Now, then, what the poet does with concepts in his department, the worker in the great industrial world can do with the concepts pertaining to his department, just the same, and so become an inventor—an industrial poet, if I may so speak, writing his poetry in steel and iron, with the living fire of steam and electricity, and his poem, too, will abide to bless humanity.

M. Puvis de Chavannes was secured to decorate the walls and ceiling of a large room in fresco work. He could be seen for several days doing nothing but standing in the empty room, gazing earnestly at the bare walls. When remonstrated with for this waste of time, he replied: "I have to see my pictures before I can paint them."

So in the great industrial world you have to get your ideas before you can apply them, or work them out in tangible form. And all you have to do in order to get them is, as the painter did, to spend some time in thought to make and use your table of concepts, for then the ideas will come—and come thick, fast, and good.

That last word, "good," needs some emphasis and explanation. In order to make your ideas "good" and have them "make good," never forget to

Make Nature your standard and handmaid. Stick close to Nature, go down to the workshop and to the laboratory, to tests, to sensations, to the foundation

of the mental pyramid, if you would avoid association of concepts that would be false and misleading.

Many imaginative people are unreliable simply because they fail to observe the above caution and safeguard. For instance, they see some incident, and then when describing it afterwards they cannot refrain from a temptation to embellish it, to depart from the actual facts by adding to them the thoughts and pictures that are drawn into the mind by the law of association, the actual incident suggesting others that do not belong to it at all but are used nevertheless in the description to color it with.

"A large proportion of the lies told by young children are of this character," says Professor Titchener. "They are not due to any moral defect; the children are simply unable to distinguish between fact and fancy. It is simply that imagination colors the story in the telling. They must be taught the distinction in the course of education. Rightly schooled, imagination is of the greatest service in life."

This is a subtle habit with large numbers of people. They take a fact and add a fancy to it; which immediately colors and falsifies the fact. Their statements contain the fact, but more than the fact; they give the whole truth, but not "nothing but the truth."

An example of negative imagination. An Eng-

lish clergyman writes thus of ants: "I have noticed a subterranean ant-cemetery, where I have seen some ants burying their dead by placing earth above them. One ant was evidently very much affected, and tried to exhume the bodies; but the united exertions of the yellow sextons were more than sufficient to neutralize the effort of the disconsolate mourner."

Concerning this recital Professor Wundt asks: "How much is fact, and how much imagination? It is a fact that ants carry out of the nest, deposit near by, and cover up dead bodies, just as they do anything else that is in their way. In the observed case they were evidently interrupted in this occupation by another ant, and resisted its interference. The cemetery, the sextons, the feelings of the disconsolate mourner which impelled her to exhume the body of her departed—all this is a fiction of the sympathetic imagination of the observer."

Fancy and fact. In cultivating the constructive imagination, therefore, whether for literary or practical purposes, be careful not to confound fancy with fact.

I analyze or define "fancy" to be constructive imagination uncorrected by Nature, or, the bringing together of images which do not fit. Body of horse plus head of man equals "centaur"; head and body of man plus two legs of goat equals "satyr"; head and body of woman plus tail of fish equals "mer-

maid"; dog's body plus three human heads equals "Cerberus"; horse plus wings equals "Pegasus," and so on indefinitely.

Control of imagination. Imagination must not be allowed to lead us astray. The dearest projects of life idealized before the mind's eye by imagination must be tested by common sense and science. We must go down and back to sensations, to the laboratory, to Nature, to judgment and reason, to standards of research and measurement, in order to justify or condemn the products of our imagination.

"Back to Nature" must be our cry, lest we fly too high, too far up into the thin air of fancy and psychological licentiousness, commingling concepts which ought never to have been brought together, but forever kept apart.

Repulsion is just as necessary and saving a law of sound selection as attraction; repulsion is elimination of the unfit, waste matter from the body and wrong material from the mind, and in both it tends to health. Olive Schreiner says of the Hunter in "Dreams": "With his shuttle of imagination he dug out stones; but half of them would not fit"—therefore were they rolled away.

Nevertheless, all these grotesque products of fancy, the extreme form of constructive imagination, serve a purpose, which is, to impress upon our minds a sense of freedom, the feeling that we can, in a sense, do with our concepts, notions, and ideas

just what we wish. Fairy tales therefore have their place. Froebel says: "They expand the child's heart and soul and unfold life in freedom and power."

But freedom, as stated before, should not run on into unrestrained and unregulated license. Nature herself, in the plenitude of her powers and forms, as well as in the history of man and the story of his mind and its marvels, furnishes us quite enough wonders, wonders without and wonders within, quite enough, I say, to satisfy and more than satisfy our innate hunger for the marvelous and the strange.

The geologist has never actually seen with his physical eyes a pterodactyl, and yet he submits an accurate and detailed account of this marvelous monster, an account which is based on facts in Nature—his constructive imagination rests on Nature, is corrected and guided by her; consequently it is not misleading, but instructive, inspiring, valuable. And this leads me to say that in sound constructive imagination the educated excel.

The educated excel. While it is true that in some phases of reconstructive imagination the uneducated and even superstitious excel, nevertheless in constructive imagination the matter is evened up, for here the educated hold the balance of power. By the word "educated" we do not limit ourselves to a college course or scholastic education; but we

also mean, as Mr. Sheldon soundly teaches, the nourishing of the mind by useful knowledge (images and concepts, and thoughts of the first, second, third, and fourth degrees), and the "educating of the positive qualities of intellect, sensibilities, and will by use."

"Creative imagination," says Professor Titchener, "is wholly foreign to a mind that has not risen above the level of passive attention," the level of mere sensating and imaging, which is the child state, the easy-going and sensuous state, the state of involuntary, undirected, unguided, or drifting attention.

Constructive imagination highest intellectual faculty. Herbert Spencer calls constructive imagination "the highest intellectual faculty." The records show that in the lower stages of mental evolution, that is, in primitive man, constructive imagination is feeble; but that it strengthens with each stage of intellectual progress and constitutes a characteristic mark of advancing civilization, art, and science.

In primitive man imagination rarely goes beyond memory, the simple rehearsal of past events, adding little that is new in a persistent repeating of all that is old. Tradition thus becomes no mean source of actual history, just because of this primitive trait of religiously sticking unchangeably to the old.

"During the earlier stages of human evolution,"

says Spencer, "imagination, being almost exclusively reminiscent, is almost incapable of evolving new ideas. In that sphere which answers to literature, its activity is limited to the narration of past events, and generation after generation passes without a discovery or an invention."

It is only when we arrive at the later and higher grades of civilization that we behold imagination at its best.

"The mental evolution which accompanies civilization," says the philosopher just quoted above, "makes imagination more vivid, more comprehensive, more exact. Gaining greater freedom as it reaches more advanced stages, it enters into combinations never before formed; and so there result conceptions which we call original."

This ushers in the age of invention and discovery. "Literature and art are no longer wholly reminiscent; knowledge, ceasing to consist entirely of statements received from ancestors, grows by the addition of new truths, reached through original imaginations; and industry, from appliances once transmitted unchanged age after age, advances to appliances that are with ever-growing abundance framed in correspondence with conceptions that never before existed. . . . Instead of constructive imagination being, as commonly supposed, an endowment peculiar to the poet and writer of fiction, it is questionable whether the man of sci-

ence, truly so called, does not possess even more of it. When imagination rises into the constructive form, there is an ever increasing originality which tells at once on the industrial arts, on science, and on literature."

Some one has remarked that man has a visible and an invisible workshop; the visible workshop is his bodily environment and the invisible workshop is his imagination. "Workshop" is a good word right there, for it takes work to employ imagination as we are here recommending. When a sculptor resolves to chisel a statue he assiduously studies the whole story of the subject he intends to work out, be it a general, a goddess, some symbolical figure, or whatever. Note, he **studies** his subject.

When a novelist sets to work to write a romance, he labors at every detailed image, scene, situation, event, character, selecting here, rejecting there, trying this and that, gathering his materials, and the finished product is the reward of the antecedent drudgery.

It cost Professor Gates thousands of dollars and many years of time to get the concepts of acoustics and electricity, the two sciences which he has especially employed to demonstrate the psychological principles involved in the mental pyramid.

Use of dictionary to get concepts. One way, a short way, a "short cut," to get the concepts pertaining to your particular department would be **to**

go over a dictionary and mark every word bearing on it, directly or indirectly, but especially directly; then make a list of these words, an alphabetical list or one arranged by subjects or classes, and number them. Begin with No. 1, run it down the whole list, asking Nature in workshop or laboratory about each combination; and then take No. 2 down the list, and so on to the end.

But this is not all, for you could combine these concepts not only in pairs or twos, but also in threes, and in fours, and in fives, all along the list.

In this way, doing a little every day, you would get so many new ideas that one lifetime would not suffice to put them all into practice, into business, into science, or into art.

Making imagination a science. This system makes a science out of imagination and the handling of it. It makes a science of the invention processes, it exalts invention into an art, into an orderly and not a disorderly proceeding, into a method and not an accident, into a system and not a chance.

But, of course, like any other branch of science, it requires **work.** There is no royal road to success, no magic formula with which to astound humanity. You can't shake inventions out of your sleeves, but you can **work them out of your imagination based on images and concepts approved by Nature.**

"Camera" and "microscope" are two of the concepts in the sciences of optics and in the business

of manufacturing and selling optical goods. What relation does the camera hold to the microscope? Any, or none?

A gentleman in England set his imagination to the task and was the first to think of putting these two instruments together. But how could they work together or be used together, and what good would it be?

He began his experiments, he went to work, he turned to sensations, he looked to Nature to see what she had to say, and he soon saw her nodding approval, so that to-day this dual machine is used, among other things, to detect blood stains, to discover murderers and bring them to justice. Even if the cloth is washed white and clean, as the criminal fondly hopes, this keen double eye of the camera-microscope will still spy out the globules of the red life fluid and put the detectives on the scent.

Here again imagination leads to progress by going to work and taking Nature into the company.

So with each and every case of the coupling of concepts. It means patience, love, labor, "close to Nature's heart"; then love's labors are never lost.

Make use of voluntary imagination. We opened this chapter with a few paragraphs concerning involuntary imagination; and now if, in spite of all that has been said regarding constructive, voluntary, or systematic imagination, you still prefer to

wait and wait and wait, and let ideas find you instead of going out like a psychological knight to find and fetter them, then we wish to help you even in this old method as much as possible, and therefore present the following ideas relating to the subject.

Professor James thinks that fully one third of our mental life consists in ideas about to be uttered, views and schemes of thought not yet articulate, floating visions and forms of the involuntary constructive imagination. I think his estimate is correct, don't you?

Many ideas that are never expressed flit more or less dimly across the field of consciousness—we have not time to express them, not time to catch and hold them long enough. Sometimes these ideas fairly crowd on each other in their mad quest for expression, for recognition, for birth, and sometimes, alas! they are so few and far between that we have deliberately to go fishing in the "vast abyss" of our slovenly, slow, and sleepy souls in order to hook one and bring it to light.

Catch and chain your ideas. Therefore I earnestly recommend that when a good idea, or a new, original, or unusual idea strikes you, you should regard it as an angel's visit, and chain the angel. Better take time to catch one to have and to hold, than to see a thousand flit dreamily by and be lost for-

ever. Chain the angel with chains of black, that is, write down the idea while it is fresh before you.

Do not procrastinate, thinking that at some more convenient season you will recall it and then write it down, for seldom is this possible, unless you have cultivated memory and introspection to a remarkable degree. These ideas caught on the fly may immensely enrich your business and your work. Any one of them may prove a key to open for you some unknown apartment in the palace of truth.

Oh! the joy of the explorer!

The thrill of the discoverer!

The pæans of the pioneer!

CHAPTER IV

CONCLUSION

IMAGINATION is like the Enchanted Horse of Arabia, for with inconceivable velocity it annihilates space and alights wherever the master, who possesses the secret of its government, desires.

Differences in imagination in people do not consist in differences in heredity, but in the fact that one person has more images and concepts at his command than another person, and more activity and agility in combining them.

Imagination glorifies life. Oh, the joys and triumphs of imagination! Poor deaf Beethoven wept tears of joy, they rolled down his cheeks, as he imagined how the music sounded which he could no longer hear by outward sensation. His was a rich and beautiful reconstructive imagination based upon the memories of the past.

In a certain city there was a young girl, full of life and enthusiasm, who was very fond of travel and of new sights, but whose daily duties compelled her to walk back and forth to her work on the same familiar city streets fifty weeks in the year. What should she do? Pine, fret, complain, wither? Not she. Listen to her philosophy:

"Sometimes, when I am tired to death of the same old streets and buildings, and fairly ache for something new and interesting to explore, I try to imagine that I am a stranger in the city, and I look at everything as if I had never seen it before. I say to myself, 'Is this the main street?' and then I think, 'No, the cross street looks busier.' I make believe I don't know what the big buildings are for —what sort of occupation goes on inside of them, I mean—and I look them all over and decide for myself, and really, it is astonishing how much you will see that you never saw before. It is, in fact, quite interesting."

Imagination constructs new out of old, interesting out of dull, famous out of the obscure, and haloes death with life.

Why can't the fiery steel industry, for manager and man alike, be glorified through imagination? Is the heaven-given fire of imagination fit only for parlors, schools, and art halls? If leisure for study and thought be found, why can't the soul of the brawny workman find joy even in the making of steel rails?

Would he not, instead of seeing a molten, hissing serpent of writhing metal, ready to pierce him through in any unguarded moment, behold, with the soul's awakened eye, a pathway round the earth, an "open road," a "Passage to India," a firm and stable path to peace, a bond of brotherhood? Or,

may he not see it spiritualized, becoming the giant skeleton-framework of a marvelous temple wherein are taught the arts and sciences, to the deep joy and happiness of all mankind?

Ah, we live only when we see everything in its relation to every other thing.

Ruskin said, "It is only by work that thought can be made healthy, and only by thought that work can be made happy."

Imagination and immortality. But there is still a profounder side to this great subject of imagination.

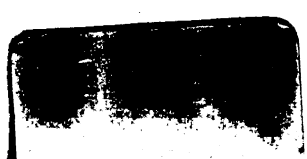
Imagination, remember, is constructive, creative. If so, it may become the veritable beginning of immortality. I mean personal immortality. I mean conquest of death.

"To conceive of a thing is proof of its existence in some form or condition, here or elsewhere."

If I conceive of or imagine survival after death and hold on to that idea, it will at last lay hold of me and mold me; I am thus helping myself onward and forward to it; I am making it real, actual, factual, creating it, literally constructing it by this tremendous spiritual potency of imagination. And this is but another name for "Faith," and faith is, after all, the greatest of all the mysteries of the mind, the first of all the forces of the soul. At this profound point it connects with the great world of true religion.

In conclusion: A man, any man, may be a master in some field, small though it be. He can be first at Fiesole, even if he cannot be second at Rome. Every man, every workingman, can preëmpt a limited area in which he knows more than any other man, a territory where he reaches the frontier and can exercise the powers of original thought, a sphere in which he can be an authority and not an echo.

Ideas, and the way they follow each other, are like seeds of life in many points: They may be small, but full of latent life, may grow into vast proportions, may bear much fruit, may reproduce themselves down the ages, may attain to practical indestructibility. Think of such a power lying within you unused, unchallenged, unrecognized, ignored!

Wake up!

For the world waits!